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Atmospheric Loadings to Waters of the Four Upper Great Lakes. A Status Report

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ATMOSPHERIC LOADINGS TO WATERS OF THE FOUR UPPER GREAT LAKES

A STATUS REPORT

prepared by

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February, 1980

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16. ABSTRACT

This report contains a summary of loadings to the lakes for 33 parameters including pH, conductance, solids, sulfates, chlorides, nitrogens, phosphorus, and 23 metals, during the period from August , 1978 to July, 1979. The report also contains an assessment of problems which plague the program and recommendations to follow in order for Region V to obtain useable atmospheric loading data.

17. KEY WORDS AND DOCUMENT ANALYSIS

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Deposition	Event Measurements	14G

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RECOMMENDATIONS

The existing EPA, Region V network of 30 bulk samplers on land should be continued. To strengthen the atmospheric loading program, wet-dry or "event" samplers should be added to 20 of the sites. That would enable measurements of total loading and wet deposition. Dry deposition could be estimated by difference.

Field and laboratory functions of the atmospheric program should be contracted. Collection of the samples should be contracted to one company which can in turn subcontract to those operators who actually collect the samples. Laboratory analyses should be done at the CRL by a contractor. All analyses should be completed within two weeks after arrival at the CRL.

A regional study plan is currently being drafted which recommends replacement of 30 bulk samplers with wet-dry "event" samplers. However this program is not expected to be operational until next fiscal year, if approved.

The Region V EPA, and R&D atmospheric programs should be coordinated by the S&A Senior Research Advisor so that data are available to both programs on a timely basis. Alternately, those stations operated by R&D should not be included in the Region V study.

Arsenic, copper, cadmium, chromium, lead and silver should be analyzed by flameless atomic absorption or other means which will readily attain detection limits of 0.1 ug/l.

Future atmospheric sampling should include PCB's pesticides and other organics, but this will require modification of the samplers.

Samplers at Superior, Wisconsin, Silver Bay, Grand Marais and Two Harbors, Minnesota should be relocated out of the influence of industrial activity.

The sampler at Port Sanilac should be discontinued and moved to the coast guard station at Alpena, Michigan. Other station locations are acceptable.

Despite analytical and operational problems which plague the atmospheric loading program, data cited in this report should be merged with Canadian data so that final loading estimates for nutrients, metals and minerals can be calculated for each Great Lake. IJC sources have commented to the author, that American-Canadian data cannot be merged until the Great Lakes Commission gives its approval. This is not expected to happen before the November, 1980 meeting. Final percentage contributions of the parameters cannot be tallied until data from both sides of the border are assembled.

CONCLUSIONS

Based on data collected by bulk precipitation samplers, significant concentrations of minerals, nutrients, solids, calcium, magnesium, zinc, lead, iron, and aluminum are being deposited to the four upper Great Lakes from the atmosphere.

Average pH values were less than 5, which indicated that the combined materials deposited to the lakes were acidic.

Metal loadings to Lake Superior near Minnesota appeared to be higher than at the other stations due to local industrial influences. While data are higher, and the samplers may have to be moved, nevertheless, industrial operations are adding significant loadings to Lake Superior.

Data were incomplete at many of the Region V operated stations and all of the EPA, R&D operated stations. The reasons are due to operational problems involving volunteer operators and lack-of timely analysis by CRL and R&D.

Metal samples were analyzed by inductively coupled plasma, which resulted in many values which were reported at "less than". The method is not sensitive enough for lead, cadmium, silver, copper, chromium and some other transition metals of interest.

There are many inherent problems in the bulk precipitation collector program, such as the design of the sampler, the constant leakage of plastic bags, improper usage of bug screens, shipment of supplies, careful examination of field sheets to determine whether the samples are valid, and many other problems which make it difficult to get a valid sample each month. The program needs more overall (internal or external) management devoted entirely to atmospheric loading.

Sampling was not conducted for pesticides, PCB's and other organics. The original study plan called for sampling twice per year on a grab basis. It is impossible to take samples out of the bulk samplers because the collectors are plastic bags.

The precision of the overall process as estimated by usage of paired samplers at Cudahy and Superior, Wisconsin was 22% and 39% respectively at those sites.

OBJECTIVES

The purpose of this study was to estimate total atmospheric loadings to the waters of the four upper Great Lakes for selected chemical parameters. The chemical parameters were chosen because some are known to be toxic, while others may contribute to eutrophication of the lakes. Due to incomplete data at some stations, and other shortcomings of the study, this report represents both a summary of the loadings and deficiencies of the study program.

INTRODUCTION

The quantity of material input to the waters of the Great Lakes from the atmosphere impacts significantly on the water quality of the lakes. For example, atmospheric inputs (wet and dry deposition) make up about 19% of the total phosphorus loading to Lake Superior and 11% of the loading to Lake Huron (U.L. R.G. Vol I, 1977). In addition, atmospheric loadings are estimated to contribute 30-40% of the total metal loadings to the upper Lakes as well as being a primary pathway for synthetic organics to these water bodies.

Atmospheric contributions to the Lower Lakes are somewhat less significant, as Shiomi and Kuntz (1973) and Kuntz (1977) have indicated that between 5 and 15% of the loading for N and P are contributed to Lake Ontario by the atmospheric processes and about 5% of the P loading to Lake Erie is from this source.

To date, studies have measured the total loading (both wet and dry deposition) to the lakes; so called "bulk-precipitation" measurements. Currently, new samplers on the Canadian side are being used to determine the relative contribution of wet and dry deposition to the total loading.

Data collected in this study were acquired using modified bulk-precipitation collectors, located within the American boundaries of the Great Lakes. Data will be eventually merged with Canadian atmospheric loading data to acquire total loadings for the Great Lakes.

This study also includes data on pH, specific conductance, sulfates, chlorides and nitrates, which can be used to supplement acid rain data sought by researchers and surveillance personnel.

DESCRIPTION OF SAMPLING PROGRAM

Modified bulk precipitation samplers were located in the 30 areas listed in Table 1 and shown on Figure 1. These sampling site areas were selected to give representative information concerning variations in precipitation and dry particulate matter chemistry within the major agricultural, forested, and industrial/urban regions considering the best available knowledge of prevailing winds, source of atmospheric pollutants, prevalent forms of deposition, frequency and amount of precipitation events, and other meteorological and physical processes.

Figure 2 is a drawing of the original bulk precipitation collector. The original collector was modified by adding two additional standpipes to it in order enable analysis of preserved samples. The three-moduled, modified bulk precipitation collector enable analyses of pH, conductance and other minerals from the unpreserved standpipe, nutrients (nitrogen and phosphorus) from a sulfuric acid preserved module and total metals from a nitric acid preserved module.

Samples were collected monthly by the volunteer operators (whose names are listed in Table 1) and mailed to the EPA, Region V, Central Regional Laboratory (CRL) in Chicago, Illinois. In the field, the contents of each bag were poured into one liter bottles. The excess volume over one liter was recorded on a data sheet for each sample type (minerals, nutrients, metals) and the excess water in each bag was discarded. Final volumes were calculated by summing one liter plus the excess volumes in each bag. During months when precipitation was low and there was insufficient water to fill to the one liter mark of the bottle, the volume was measured (by weight) and recorded in the laboratory.

ANALYTICAL PROCEDURES

Bulk precipitation samples were analyzed using water analysis procedures. Dry deposition matter adhering to plastic bags were leached with acid and distilled water and analyzed as water samples. The collector bags for the unpreserved samples were not leached with acid.

All demand parameters were analyzed by standard EPA procedures. Nutrient samples were preserved with 12 ml of 33% sulfuric acid, and metals samples were preserved with 12 ml of 33% nitric acid, which produced concentrations greater than 2 ml sulfuric and nitric acids per liter of sample for the large majority of samples. These procedures are defined in the 1974 edition of "Methods for Chemical Analyses of Water and Waste", EPA Publication No. EPA-625/6-74-003.

All metal parameters, except mercury were analyzed using the CRL inductively coupled argon plasma atomic emission spectrometer (ICAP-AES) procedure. Mercury was determined via a CRL semi-automated method (Anal, Chem., 48, 110, 1976).

QUALITY ASSURANCE

Paired bulk samplers were installed and operated at Pinconning, Michigan, Chicago, Illinois, Milwaukee Superior, Wisconsin, to estimate the precision for the total process (sampling, sample transportation, and analyses) for each parameter.

RESULTS

Appendices I and II contain parameter concentration and loading data for 30 stations for the period August 1978 to July, 1979.

Parameter concentrations are expressed in milligrams per liter (mg/l) for minerals, nutrients and solids, micrograms per liter (ug/l) for metals, micromhos per centimeters (umhos/cm) for specific conductance and pH units for pH.

Parameter loadings are expressed milligrams per square meter per day ($mg/M^2/day$) for minerals, nitrients and solids, and micrograms per square meter per day ($ug/M^2/day$) for metals. Loadings are not expressed for pH and conductance.

The following factors were used for calculation of loading.

Diameter of Sampling Collector = 10 inches
Area of Sampling Collector = R^2
Radius of Sampling Collector R = 5
Area of Sampling Collector = 25 x 3.14
Area of Sampling Collector = 78.54 sq. inches
= 506.41 sq. cm
Area in square meters = 0.0506 sq. meter

Loading in milligrams per square meter per day
conc (mg/l x volume (liters) = milligrams (mg)
milligrams ÷ 30 days = mg/day

$$= \frac{\text{mg/day}}{0.0506 \text{ sq. m.}}$$

$= mg/m^2/day$

Significant loadings for minerals, nutrients, solids and several metals were deposited on the four Upper Lakes.

Higher loadings occurred on the Ohio shoreline and in areas of higher industrial activity.

Higher than average loadings of aluminum, iron, zinc, titanium and lead were deposited on Lake Superior, at Bayfield and Superior, Wisconsin, Grand Marais, Silver Bay, and Two Harbors, Minnesota. It appears that the heavy loadings are due to fallout from on-shore ore operations especially at Superior, Wisconsin.

The pH of the atmospheric samples averaged approximately 4.5 overall, with the low (2.1) and high (7.9) being measured at Bayfield, Wisconsin and Ontanagon, Michigan respectively, two remote areas.

The acidic precipitation at nearly all of the stations appeared to be related to either the sulfate, chloride or nitrate data.

Data were incomplete for many of the stations operated by Region V personnel including Port Sanilac, Glen Haven, Chicago and Zion, Illinois. The station at Isle Royal National Park is only operated during the park's open season.

Data are not reported for stations 7 through 12. These stations are part of the American network of stations but are operated by EPA, Research and Development personnel. Many of the analyses were done at the CRL.

Table II contains paired sample data for each parameter. Two samplers were located approximately 100 feet or less apart from each other at Milwaukee (Cudahy) and at Superior, Wisconsin to estimate the precision of the total collection and analysis process. The values in Table II represent the daily average loading values (in mg/M^2/day and ug/M^2/day) from August 1978 to July 1979 for most parameters. The precision (or percent deviation) data were estimated by the following formula:

$$\frac{\text{First Value - Second Value}}{\text{Highest Value of the Two}} \text{ X } 100 = \%\text{ Deviation}$$

The overall precision was 22% at Milwaukee at 39% at Superior. At this time, an explanation cannot be given for the differences inprecision. However, the precision of the overall sequence of deposition (rain, snow, dry fallout), sample collection and handling, plus laboratory analysis was suprisingly good considering the number of variables involved.

The design of the samplers are such that evaporation or volatilization may be factors influencing the analytical results. Studies were not conducted regarding these factors.

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TABLE I

Atmospheric Sampling Station Locations
East to West

Location	Operator
1. Conneaut, Ohio	Mr. Edgar Coates
2. Painesville, Ohio	Mr. Byron Carpenter
3. Vermilion, Ohio	Mr.George Swinehart
4. Oak Harbor, Ohio	Mr. Karl Bednarick
5. Grosse Ile, Michigan	Dr. Michael Mullin
6. Port Sanilac, Michigan	Mr. Donald Barr
7. Port Crescent, Michigan	Dr. Michael Mullin
8. Bay City, Michigan	Dr. Michael Mullin
9. Pinconning, Michigan (2)	Dr. Michael Mullin
10. Augres, Michigan (Whitestone Pt.)	Dr. Michael Mullin
11. Tawas City, Michigan	Dr. Michael Mullin
12. Paradise, Michigan	Mr. Michael Mullen
13. Grand Marais, Michigan	Mr. Robert Lanane
14. Baraga, Michigan	Mr. Richards Earls
15. Houghton, Michigan (Isle Royal)	Mr. Stuart Croll
16. Copper Harbor, Michigan	Mr. Robert Hill
17. Ontonagun, Michigan	Mr. David Balbough
18. Beaver Island, Michigan	Mr. Bernard Wagner
19. Glen Haven, Michigan	Mr. David Linderman
20. St. Joseph, Michigan	Mr. Joseph Collins
21. Chicago, Illinois (2)	Mr. John McQuire and Mr. James Dennis
22. Wilmette, Illinois	Mr. John McQuire and Mr. James Dennis
23. Zion, Illinois	Mr. Darrell Johnson
24. Cudahy, Wisconsin (2)	Mr. Abe Boman
25. Two Rivers,Wisconsin	Mr. James Knorr
26. Bayfield, Wisconsin	Mr. Daniel Hahn
27. Superior, Wisconsin (2)	Mr. John Pegors
28. Grand Marais, Minnesota	Mr. John Pegors
29. Silver Bay, Minnesota	Mr. John Pegors
30. Two Harbors, Minnesota	Mr. John Pegors

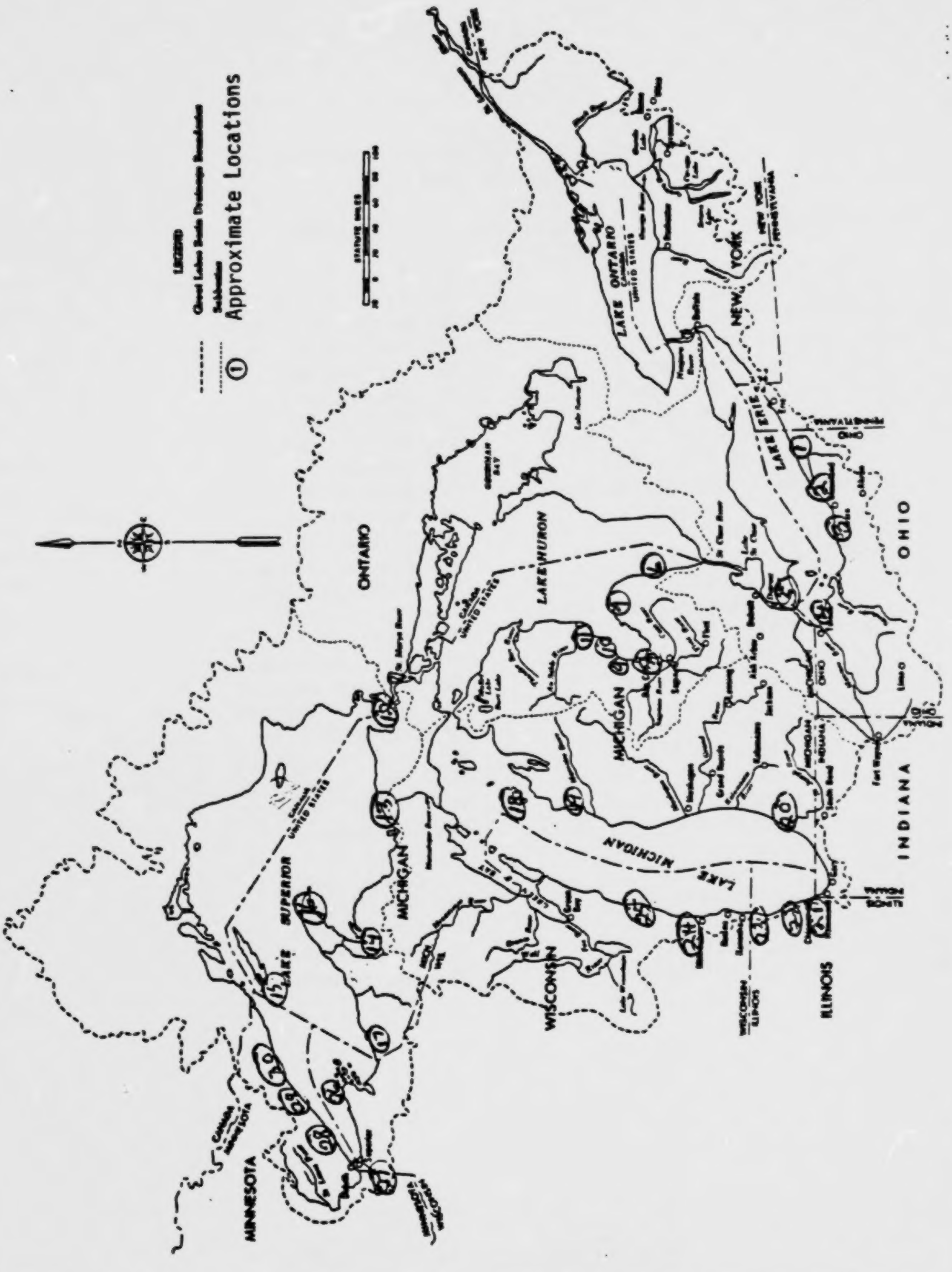
LEGEND
Great Lakes Basin Drainage Boundaries
Subbasins
① Approximate Locations
STATUTE MILES
ONTARIO
GEORGIAN BAY
LAKE HURON
LAKE SUPERIOR
LAKE MICHIGAN
LAKE ERIE
LAKE ONTARIO
NEW YORK
OHIO
INDIANA
ILLINOIS
WISCONSIN
MICHIGAN
MINNESOTA

FIGURE 1 **Great Lakes Basin Subbasins** - Atmospheric Sampling Station Locations

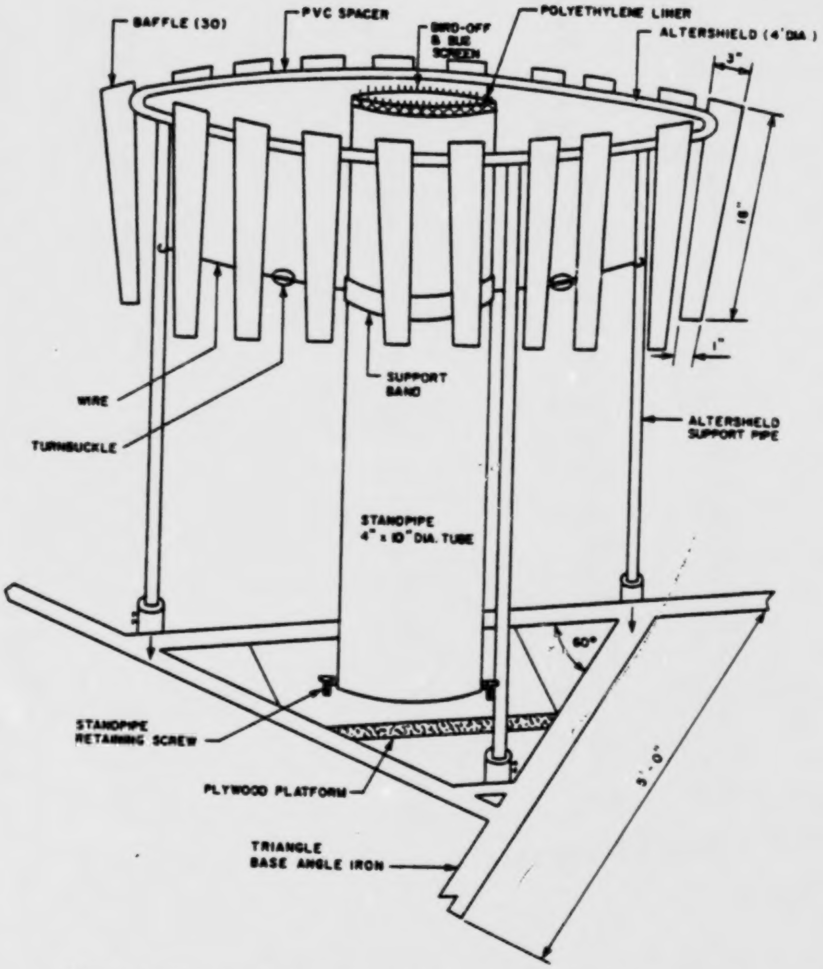
BAFFLE (30)
PVC SPACER
BIRD-OFF & BUG SCREEN
POLYETHYLENE LINER
ALTERSHIELD (4' DIA.)
3"
18"
1"
WIRE
TURNBUCKLE
SUPPORT BAND
ALTERSHIELD SUPPORT PIPE
STANDPIPE 4" x 10" DIA. TUBE
60°
STANDPIPE RETAINING SCREW
PLYWOOD PLATFORM
5'-0"
TRIANGLE BASE ANGLE IRON

FIGURE 2—MONTHLY SAMPLER FOR RAIN AND SNOW WITH ALTER SHIELD.

TABLE II

Precision of the Overall Process

Parameter	SAMPLER I Cudahy, Wisconsin		SAMPLER II Cudahy, Wisconsin Precision (in %)	SAMPLER I Superior, Wisconsin		SAMPLER II Superior, Wisconsin Precision (in %)
	Loading	Average		Loading	Average	
Cl-	3.3	3.3	0	7.4	5.2	30
$SO_4^=$	13.7	9.2	33	32.1	29.8	7
SS	38	33	13	125	106	15
DS	60	54	10	178	127	29
Ca	12.1	K4	67	50.8	33	35
Mg	4.6	4.1	11	2.7	1.6	41
Na	3.5	2.5	29	5.3	K.9	81
Al	1603	1687	5	3693	2753	25
B	K58	80	64	199	K58	71
Ba	27	31	13	73	38	48
Be	K1	K1	-	K1	K1	-
Cd	K1	K1	-	K	K1	-
Co	K1	K1	-	K	K1	-
C	24	24	0	13	10	23
Cu	50	35	30	64	26	59
Hg	0.6	K.1	84	K.1	0.2	50
Fe	1937	2959	35	6984	5774	17
Mn	74	76	3	522	191	63
Mo	25	28	11	21	11	48
Ni	23	19	17	12	K4	67
Pb	246	209	15	264	121	54
Sn	26	25	12	K5	K5	-
Ti	78	153	49	195	146	25
V	10	12	17	20	15	25
Zn	593	556	6	555	296	47
Ag	K1	K1	-	3	K1	67
NH_3	2.15	2.61	18	1.76	1.63	7
TKN	3.21	3.77	15	3.51	2.56	27
NO_3	2.58	2.95	12	2.78	1.81	35
P	0.17	0.17	0	0.43	0.18	58
Si	0.5	0.4	20	53	5.2	2
	Overall Average		22%			39%

APPENDIX I

Station Location Conneaut, Ohio

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO4	Average	umhos/cm	
Aug 78	2000	2000	2000	2000	-	-
Sept 78	4700	4000	4400	4367	540*	2.0
Oct 78	2600	3000	-	3000	83	4.2
Nov 78	1200	1400	1000	1200	94	3.9
Dec 78	950	950	950	950	29	4.6
Jan 79	2200	2200	900	-	610*	2.8
Feb 79	2500	2520	2540	2520	42	5.7
Mar 79	500	500	2500	-	54	6.2
Apr 79	4000	500	3800	-	35	5.2
May 79	3000	2800	3000	2933	92	4.0
June 79	2200	2200	2400	2270	96	4.4
July 79	2700	1600	1300	1867	92	3.3
Average	2379	1972	2253	2345	66	4.3
High	4700	4000	4400	4367	96	6.2
Low	500	500	900	950	29	2.0

*Not averaged, probable acid contaminatio

Station Location Conneaut, Ohio

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	7.8	2.1	3.4
Sept 78	K1	4	10	74	K5	1.1	K1.2
Oct 78	1	8	K5	54	K5	1.4	K1.2
Nov 78	1	9	20	61	8.6	1.8	K1.2
Dec 78	1.8	4.8	K5	20	17.6	3.5	5.9
Jan 79	1.0	2.1	16	398*	K5	0.2	K1.2
Feb 79	2.1	5.9	21	26	K5	1.3	K1.2
Mar 79	K1	1.7	-	34	8.1	515	K1.2
Apr 79	K1	5.8	K5	23	-	-	-
May 79	K1	14.6	11	60	7.6	1.2	K1.2
June 79	1.3	15.7	5	62	-	-	-
July 79	1.0	8.8	5	6	K5	0.1	K1.2
Average	1.1	6.2	10.7	47	6.3	1.6	1.8
High	2.1	14.6	96	74	17.6	3.5	5.9
Low	K1	1.7	K5	20	K5	0.0	K1.2

*Not averaged, probable acid contaminati

Station Location Conneaut, Ohio

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.03	4.32	3.18	0.57	-
Sept 78	1.42	2.57	2.22	0.09	0.7
Oct 78	-	-	-	-	-
Nov 78	0.65	1.05	1.47	0.09	0.2
Dec 78	0.25	0.48	0.72	K.02	0.1
Jan 79	0.26	.38	.86	.03	0.2
Feb 79	0.11	0.32	0.78	0.02	0.1
Mar 79	0.55	1.15	1.09	0.05	1.1
Apr 79	0.78	1.73	0.71	0.30	0.1
May 79	1.61	3.57	2.70	0.19	0.2
June 79	2.28	5.58	3.71	0.18	0.3
July 79	0.54	1.43	2.45	0.07	0.1
Average	.72	2.0	1.9	.14	0.3
High	2.28	5.58	3.71	.57	1.1
Low	0.11	0.32	0.71	K.02	0.1

Station Location Conneaut, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	955	K80	24	K1	K2	K2	13	31	K.1
Sept 78	K90	K80	13	K1	K2	K2	K5	K9	K.1
Oct 78	262	K80	12	K1	K2	K2	K5	10	K.1
Nov 78	667	92	18	K1	K2	K2	6	25	K.1
Dec 78	114	K80	11	K1	K2	3	K5	28	.1
Jan 79	1750	148	45	2	K2	13	41	35	K.1
Feb 79	869	116	16	K1	K2	12	K5	16	K.1
Mar 79	1700	K80	31	K1	5	K2	23	37	K.1
Apr 79	-	-	-	-	-	-	-	-	-
May 79	562	K80	14	K1	K2	K2	K5	47	-
June 79	-	-	-	-	-	-	-	-	-
July 79	425	K80	7	K1	K2	K5	K5	27	-
Average	666	74	20	K1	K2	5	10	21	K.1
High	1750	148	45	2	K2	13	41	35	.1
Low	K90	K80	11	K1	K2	K2	K5	K9	K.1

1/2 the K values were used in computing the aver

Station Location Conneaut, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	2890	67	9	K5	77	22	41	K2	196	K1
Sept 78	K120	19	K6	K5	K15	K8	K6	K2	71	K1
Oct 78	373	40	K6	K5	27	K8	13	K2	162	K1
Nov 78	2920	66	K6	K5	64	K8	24	4	276	K1
Dec 78	162	K6	7	K5	K15	K8	K6	K2	354	K1
Jan 79	9070	24	14	K5	45	K8	107	5	134	K1
Feb 79	4780	37	K6	K5	38	K8	33	K2	180	K1
Mar 79	4290	74	K6	K5	K15	K8	58	K2	658	K1
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	1150	47	K6	K5	68	K8	14	K2	274	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	1130	19	K6	K5	36	K8	11	K2	106	K1
Average	2894	37	6	K5	38	K8	35	2	196	K1
High	9070	67	14	K5	77	22	127	5	354	K1
Low	K120	K6	K6	K5	K15	K8	K6	K2	71	K1

Station Location Painesville, Ohio

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	4430	4400	4760	4530	-	-
Sept 78	3790	3980	3800	3857	53	4.7
Oct 78	3660	2875	4220	3585	80	3.9
Nov 78	1400	1500	500	1133	100	6.9
Dec 78	5550	1460	3520	3510	37	5.5
Jan 79	2010	2790	2080	2293	31	4.9
Feb 79	4500	4160	3320	3993	150	3.6
Mar 79	3500	4040	3500	3680	42	5.1
Apr 79	-	1180	900	1000	-	-
May 79	5300	5350	4900	5183	58	5.1
June 79	2000	2000	2000	2000	340	6.6
July 79	3575	3450	4150	3575	10,000*	2.4*
Average	3793	3174	3763	3276	70	5.0
High	5550	5350	4900	5183	150	6.9
Low	1400	1180	500	1000	31	3.6

* Not Averaged, Acid Contamination.

Station Location Painesville, Ohio

Parameter Concentrations

Units - mg/l

1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	1.26	1.95	2.23	0.07	0.4
Oct 78	1.38	2.35	2.27	0.05	0.4
Nov 78	0.66	1.80	1.23	0.16	0.6
Dec 78	0.21	0.41	0.51	0.02	0.1
Jan 79	.19	0.35	0.72	K0.02	0.1
Feb 79	.10	0.37	0.54	K0.02	0.2
Mar 79	.33	.68	.68	.05	0.2
Apr 79	4.06	9.75	8.06	0.35	-
May 79	1.52	3.11	2.55	0.07	0.3
June 79	7.95	-	9.45	0.46	1.1
July 79	4.88	8.19	4.51	0.04	0.1
Average	1.77	2.21	3.27	0.12	0.3
High	7.95	9.75	9.45	0.46	0.6
Low	.10	0.41	0.51	K0.02	0.1

Station Location Painesville, Ohio

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	7.6	1.5	K1.2
Sept 78	1.0	6	14	K10	K5	.6	K0.9
Oct 78	1.0	8	14	52	K5	0.5	K0.9
Nov 78	8	13	22	65	13.1	1.0	5.2
Dec 78	2.8	3.9	9	24	K5	0.4	1.5
Jan 79	K1	K1	10	20	5.1	0.6	2.5
Feb 79	3.6	3.5	7	98	K5	0.3	1.6
Mar 79	1.7	7.0	28	26	K5	0.6	1.3
Apr 79	-	-	-	-	K5	0.9	1.5
May 79	1.3	7.6	36	38	K5	0.5	K1.2
June 79	5.4	37	52	221			
July 79	1.1	4.7	27	6500*	K5	.7	K1.2
Average	3.0	6.9	17.5	48	5.1	0.7	1.8
High	8	13	36	65	13.1	1.5	5.2
Low	K1	K1	7	K10	K5	0.3	K0.9

*Not averaged, acid coniamination.

Station Location Painesville, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1290	82	23	K1	K2	K2	K5	23	K.1
Sept 78	381	K80	23	K1	K2	K2	K5	10	K.1
Oct 78	422	K80	12	K1	K2	K2	K5	K9	K.1
Nov 78	851	96	15	K1	K2	K2	K5	16	K.1
Dec 78	1130	K80	11	K1	4	K2	7	18	0.2
Jan 79	468	186	8	K1	K2	K2	K5	13	K.1
Feb 79	375	K80	7	K1	K2	K2	K5	14	K.1
Mar 79	759	K80	57	K1	K2	K2	K5	10	K.1
Apr 79	1880	K80	15	K1	K2	K2	K5	20	K.1
May 79	364	K80	16	K1	K2	K2	K5	K9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	426	338	13	K1	K2	K2	K5	9	-
Average	702	75	14	K1	K2	K2	K5	16	K.1
High	1290	186	23	K1	4	K2	7	23	0.2
Low	375	K80	7	K1	K2	K2	K5	K9	K.1

Station Location Painesville, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	2480	68	9	K5	77	22	58	5	119	K1
Sept 78	463	23	K6	K5	32	K8	20	K2	87	K1
Oct 78	847	29	K6	K5	37	K8	21	K2	109	K1
Nov 78	906	35	11	K5	75	K8	45	K2	140	K1
Dec 78	1010	28	7	K5	63	K8	29	K2	288	K1
Jan 79	506	17	9	K5	32	K8	16	K2	163	K1
Feb 79	586	14	K6	K5	22	K8	14	K2	68	K1
Mar 79	1500	30	K6	K5	K15	K8	32	K2	104	K1
Apr 79	1760	54	K6	K5	45	K8	37	K2	127	K1
May 79	427	22	K6	K5	K15	K8	13	K2	K50	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	724	32	K6	K5	34	K8	12	K2	69	K1
Average	1392	31	6	K5	48	K8	29	K2	134	K1
High	2480	68	11	K5	77	22	58	5	288	K1
Low	463	14	K6	K5	22	K8	14	K2	68	K1

Station Location Vermillion, Ohio

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	4000	3000	-	3500	-	-
Sept 78	1360	1200	1300	1300	120	6.8
Oct 78	4700	4000	4400	4400	58	6.5
Nov 78	500	-	500	500	86	7.6
Dec 78	500	500	-	500	107	7.8
Jan 79	2380	2360	1600	2113	49	4.5
Feb 79	1630	1144	1840	1538	37	5.2
Mar 79	2600	2460	2500	2520	62	6.2
Apr 79	3600	3800	3900	3767	49	6.4
May 79	2300	3060	2680	2680	90	6.4
June 79	2850	2780	2780	2800	90	6.8
July 79	2600	800	2250	1880	71	6.2
Average	2621	2281	2674	2281	71	6.4
High	4700	4000	4400	4400	120	7.8
Low	500	500	500	500	37	4.5

Station Location Vermillion, Ohio

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	13.3	1.9	K1.2
Sept 78	1	14	K5	K10	19.6	3.2	K1.2
Oct 78	1	7	5	38	-	-	-
Nov 78	K1	4	-	56	-	-	-
Dec 78	1.2	24	243	70	21.7	4.6	K1.2
Jan 79	1.9	5.1	.68	32	5.6	2.5	1.6
Feb 79	3.1	6.7	K5	24	K5	0.9	K1.2
Mar 79	1.1	10.1	16.7	40	8.9	2.0	K1.2
Apr 79	K1	8.3	K5	32	K5	0.9	K1.2
May 79	1.3	10.3	26	59	11.6	1.7	171.2
June 79	1.0	8.7	33	59	-	-	-
July 79	K1	6.2	K5	35	13.2	2.0	K1.2
Average	1.2	9.5	34.1	34	11.0	2.2	K1.2
High	3.1	24	243	70	21.7	4.6	1.6
Low	K1	4	K5	K10	K5	0.9	K1.2

Station Location Vermillion, Ohio

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	5.95	11.0	8.25	.27	.5
Oct 78	0.89	1.71	1.48	0.10	.3
Nov 78	0.19	1.71	0.53	0.13	2.8
Dec 78	-	-	-	-	1.5
Jan 79	0.15	0.21	0.56	K0.02	0.1
Feb 79	0.21	0.24	0.92	K0.02	0.1
Mar 79	0.54	1.19	1.02	0.09	0.2
Apr 79	1.07	2.10	1.68	0.07	0.3
May 79	2.46	5.57	3.52	0.20	0.5
June 79	2.41	5.80	2.95	0.17	0.3
July 79	1.52	4.98	2.28	0.06	0.2
Average	1.54	3.45	2.32	.11	.6
High	5.95	11.0	8.25	.27	2.8
Low	0.15	0.21	0.53	K0.02	0.1

Station Location Vermillion, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	533	K80	7	K1	K2	K2	K5	21	K.1
Sept 78	650	K80	13	K1	K2	K2	K5	14	K.1
Oct 78	-	-	-	-	-	-	-	-	-
Nov 78	-	-	-	-	-	-	-	-	K.1
Dec 78	3500	90	31	K1	3	K3	10	31	K.1
Jan 79	524	K80	K6	K1	K2	K2	21	K9	K.1
Feb 79	575	K80	10	K1	K2	K2	K5	K9	K.1
Mar 79	667	K80	11	K1	K2	K2	K5	K9	K.1
Apr 79	594	K80	15	K1	K2	K2	K5	10	K.1
May 79	637	456	12	K1	K2	K2	K5	K9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	429	K80	10	K1	K2	K2	K5	19	-
Average	901	92	12	K1	K2	K2	5	12	K.1
High	3500	456	31	K1	3	K2	21	31	K.1
Low	429	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Vermillion, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	1360	62	7	K5	73	23	20	3	129	-
Sept 78	1040	95	K6	K5	102	K8	32	K2	134	K1
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	5420	134	7	K5	268	10	91	9	202	K1
Jan 79	477	28	K6	K5	58	22	9	K2	383	K1
Feb 79	725	29	K6	K5	60	K8	16	K2	115	K1
Mar 79	1430	71	K6	K5	K15	K8	23	K2	K50	K1
Apr 79	997	46	K6	K5	55	K8	22	K2	59	K1
May 79	864	63	K6	K5	K15	K8	15	K2	1750	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	968	60	K6	K5	76	K8	14	K2	131	K1
Average	1476	65	K6	K5	78	9	27	2	134	K1
High	5420	134	7	K5	268	23	91	9	383	K1
Low	477	28	K6	K5		K8	9	K2	115	K1

Station Location Crane Creek, Ohio

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	-	500	-	500	-	-
Sept 78	1450	1700	1840	1663	107	4.6
Oct 78	1160	1225	1080	1155	115	5.6
Nov 78	1200	800	1080	1080	50	4.2
Dec 78	500	500	500	500	16	6.8
Jan 79	500	500	500	500	•135	3.8
Feb 79	500	500	500	500	540	3.2
Mar 79	1815	500	500	500	150	6.3
Apr 79	3500	3560	3030	3300	170	4.6
May 79	-	-	-	-	-	-
June 79	-	-	-	-	-	-
July 79	-	-	-	-	-	-
Average	1328	1223	1066	1462	160	4.9
High	3500	3560	3030	3300	540	6.8
Low	500	500	500	500	16	3.2

Station Location Crane Creek, Ohio

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	10.0	2.5	2.5
Sept 78	1	17	K5	14	5.5	1.6	K1.2
Oct 78	3	21	K5	75	7.8	3.1	K1.2
Nov 78	K1	4.7	14	33	K5	0.4	K1.2
Dec 78	1.0	1.2	12	10	K5	0.3	K1.2
Jan 79	5.9	14.3	15.6	88	5.6	1.4	2.2
Feb 79	23.8	38.2	33	350	-	-	-
Mar 79	3.5	13.7	24.3	98	17.5	6.6	2.4
Apr 79	5	22.9	38.0	111	K5	0.3	K1.2
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	5.5	16.6	17.7	97	6.7	2.0	1.4
High	23.8	38.2	38.0	350	17.5	6.6	2.5
Low	K1	1.2	K5	10	K5	0.3	K1.2

Station Location Crane Creek, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	2.41	4.35	2.65	0.43	0.3
Oct 78	3.14	5.13	6.64	0.18	0.3
Nov 78	0.33	0.68	0.40	0.03	0.3
Dec 78	0.90	1.27	2.22	0.16	0.1
Jan 79	0.85	1.87	4.43	0.05	0.3
Feb 79	3.54	6.92	19.2	0.17	1.0
Mar 79	2.30	6.52	0.05	0.50	0.3
Apr 79	1.12	1.7	1.49	0.04	0.8
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	1.82	3.56	4.64	.20	0.4
High	3.54	6.92	19.20	0.50	1.0
Low	0.85	0.68	0.05	0.03	0.3

Station Location Crane Creek, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	272	249	K6	K1	K2	K2	6	23	K.1
Sept 78	418	K80	16	K1	K2	K2	K5	10	K.1
Oct 78	481	K80	9	K1	K2	K2	K5	K9	K.1
Nov 78	929	K80	8	K1	K2	K2	19	K9	K.1
Dec 78	562	K80	K6	K1	3	3	15	11	K.1
Jan 79	1410	149	12	K1	K2	K2	K5	18	0.1
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	0.1
Apr 79	2470	209	35	K1	3	K2	44	28	K.1
May 79	819	K80	16	K1	K2	K2	K5	K9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	920	101	13	K1	K2	K2	13	13	K.1
High	2470	249	35	K1	3	3	44	29	.1
Low	272	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Crane Creek, Ohio

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	320	29	K6	K5	28	22	8	K2	474	K1
Sept 78	526	34	K6	K5	33	K8	37	K2	116	K1
Oct 78	267	47	K6	K5	K15	K8	11	K2	298	K1
Nov 78	870	19	K6	K5	25	K8	24	K2	396	K1
Dec 78	647	14	18	K5	56	11	16	K2	230	K1
Jan 79	759	35	21	K5	115	43	17	K2	4450	K1
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	3080*	113	K6	36*	116	K8	38	10	831	K1
Apr 79	962	33	K6	K5	K15	K8	17	K2	53	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	621	46	8	K5	55	14	24	K2	942	K1
High	3080	47	21	36	115	43	37	10	4550	K1
Low	267	14	K6	K5	K15	K8	8	K2	55	K1

Station Location Paradise, Michigan

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml)				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	-	500	-	500	-	-
Sept 78	5500	5500	5500	5500	17	4.6
Oct 78	3000	2200	3000	2733	40	4.0
Nov 78	1400	1400	1200	1333	115	3.8
Dec 78	-	-	-	-	-	-
Jan 79	1300	2000	1600	1633	27	4.2
Feb 79	2000	2000	2000	2000	-	-
Mar 79	-	-	-	-	117	-
Apr 79	500	500	500	500	28	4.6
May 79	1600	3100	2800	2500	33	4.2
June 79	1380	1370	1390	1370	23	4.3
July 79	3000	4000	1200	2700	54	3.6
Average	2187	2257	2187	2087	57	4.2
High	5500	5500	5500	5500	117	4.6
Low	500	500	500	500	17	3.8

Station Location Paradise, Michigan

Parameter Concentrations
Units - mg/1
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	1.7	K1.2
Sept 78	1	5	K.5	27	K5	K0.1	K1.2
Oct 78	K1	4	K.5	26	K5	0.3	K1.2
Nov 78	1	15	8	75	K5	0.3	K1.2
Dec 78	-	-	-	-	-	-	-
Jan 79	K1	1.9	1.92	18	K5	K.1	K1.2
Feb 79	-	-	-	-	-	-	-
Mar 79	K1.0	9.6	5.3	76	K5	K.1	K1.2
Apr 79	K1	4.3	16	18	K5	.3	K1.2
May 79	K1	4.6	30	22	K5	.2	K1.2
June 79	K1	3.4	10	15	-	-	-
July 79	K1	8.1	K5	35	K5	K.1	K1.2
Average	K1	12.6	6.03	40	K5	.48	K1.2
High	1	15	16	76	K5	1.7	K1.2
Low	K1	1.9	K5	18	K5	K.1	K1.2

Station Location Paradise, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.49	0.57	0.60	0.03	0.2
Oct 78	0.32	0.42	0.94	0.03	K0.1
Nov 78	0.37	1.28	0.91	0.11	0.2
Dec 78	-	-	-	-	-
Jan 79	0.06	K0.05	2.91	K0.02	0.1
Feb 79	-	-	-	-	-
Mar 79	0.93	1.22	2.99	K0.02	K.1
Apr 79	0.50	1.38	0.35	0.09	0.1
May 79	0.85	1.49	0.98	0.05	0.1
June 79	0.57	0.88	1.14	0.04	K0.1
July 79	0.83	2.03	0.47	0.10	K0.1
Average	0.45	1.06	1.45	.05	0.1
High	0.93	1.49	2.99	0.11	0.2
Low	0.06	K0.05	0.35	K0.02	K.1

Station Location Paradise, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	242	K80	8	K1	K2	K2	11	K9	K.1
Sept 78	167	K80	9	K1	K2	K2	K5	10	K.1
Oct 78	187	K80	K6	K1	K2	K2	K5	K9	K.1
Nov 78	261	K80	K6	K1	K2	K2	K5	K9	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	225	K80	11	K1	K2	K2	K5	K9	K.1
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	136	K80	K6	K1	K2	K2	K5	K9	K.1
Apr 79	1320*	K80	6	K1	K2	K2	K5	K9	K.1
May 79	282	244	7	K1	K2	K2	K5	K9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	130	K80	K6	K1	K2	K2	K5	9	-
Average	204	K80	6	K1	K2	K2	K5	K9	K.1
High	1320	244	11	K1	K2	K2	11	10	K.1
Low	130	K80	K6	K1	K2	K2	K5	K9	K.1

*Not Averaged

Station Location Paradise, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	269	26	K6	K5	30	23	K6	K2	405	-
Sept 78	526	34	K6	K5	33	K8	37	K2	116	K1
Oct 78	379	18	K6	K5	K15	K8	K6	K2	2320	K1
Nov 78	337	33	10	K5	40	K8	10	K2	109	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	180	7	8	K5	19	22	7	K2	114	K1
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	230	10	K6	K5	K15	K8	K6	K2	204	K1
Apr 79	1130	18	K6	K5	K15	K8	36	K2	K50	K1
May 79	298	13	17	K5	K15	K8	11	K2	K50	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	194	K6	K6	K5	K15	K8	K6	K5	57	K1
Average	392	18	6	K5	17	8	12	K2	375	K1
High	1120	34	10	K5	40	23	37	K2	2320	K1
Low	180	7	K6	K5	K15	K8	K6	K2	K50	K1

Station Location Grand Marais, Michigan

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	4200	3700	4300	3700	-	-
Sept 78	3000	3000	3000	3000	11	5.2
Oct 78	1840	1890	1890	1873	30	6.0
Nov 78	1430	2850	2360	2213	9	5.1
Dec 78	4040	3920	3860	3940	39	4.5
Jan 79	2020	2300	2320	2213	23	4.3
Feb 79	1610	1720	1740	1690	50	3.9
Mar 79	1940	1920	1940	1933	82	3.5
Apr 79	1600	2200	2300	2033	40	4.3
May 79	6050	4150	2580	4260	72	3.8
June 79	5550	4550	5550	5550	55	3.4
July 79	500	500	2600	1200	-	3.2
Average	2815	2916	2870	2800	35.5	4.6
High	6050	5550	5550	5550	82	6.0
Low	500	500	1740	1200	9	3.5

Station Location Grand Marias, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	K.1	K1.2
Sept 78	1.6	3.7	K5	10	K5	K0.1	K1.2
Oct 78	1	5	7	20	6.3	1.7	K1.2
Nov 78	K1	K1	8	K10	K5	K0.1	K1.2
Dec 78	5.0	5.5	20	24	K5	1.0	1.5
Jan 79	K1	1.6	2.1	16	K5	K.1	K1.2
Feb 79	1.4	4.1	K5	34	K5	K.1	K1.2
Mar 79	K1	7.6	12.0	52	K5	.2	K1.2
Apr 79	K2	5.4	12	26	K5	K.1	K1.2
May 79	K1	8.7	7	47	K5	.2	K1.2
June 79	K1	7.8	8	36	-	-	-
July 79	K1	41	-	-	K5	.3	K1.2
Average	1.4	5.2	8.2	26	K5	.4	K1.2
High	5.0	8.7	20	52	6.3	1.7	1.5
Low	K1	K1	K5	K10	K5	K1	K1.2

Station Location Grand Marias, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.48	1.49	0.23	0.04	0.2
Oct 78	0.22	1.00	1.35	0.53	0.5
Nov 78	0.19	0.27	0.37	K0.02	K.1
Dec 78	0.54	0.80	0.06	0.05	0.6
Jan 79	0.05	0.07	0.72	K0.02	K.1
Feb 79	0.17	K0.05	3.26	K0.02	K.1
Mar 79	0.62	0.82	1.00	K0.02	0.1
Apr 79	0.46	0.50	0.34	K0.02	K.1
May 79	0.64	1.02	1.28	0.04	K.1
June 79	0.60	0.88	0.53	0.02	K.1
July 79	0.43	1.17	0.56	0.05	0.2
Average	0.34	.62	1.05	.08	.2
High	0.64	1.49	3.26	0.53	0.6
Low	0.05	K0.05	0.06	K0.02	K.1

Station Location Grand Marias, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	171	154	7	K1	8	K2	K5	21	K.1
Sept 78	139	K80	K6	K1	K2	K2	K5	K9	K.1
Oct 78	659	K80	7	K1	K2	K2	K5	19	K.1
Nov 78	332	K80	K6	K1	K2	K2	K5	K9	K.1
Dec 78	2160	85	18	K1	K2	K2	K5	17	K.1
Jan 79	229	K80	K6	K1	K2	K2	K5	12	K.1
Feb 79	163	K80	K6	K1	K2	K2	K5	11	K.1
Mar 79	350	K80	K6	K1	K2	K2	K5	K9	K.1
Apr 79	250	K80	K6	K1	K2	K2	K5	K9	K.1
May 79	241	K80	K6	K1	K2	K2	K5	K9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	349	203	K6	K1	K2	K2	K5	17	-
Average	459	69	K6	K1	K2	K2	K5	11	K.1
High	2160	203	18	K1	8	K2	K5	21	K.1
Low	139	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Grand Marais, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	K120	9	K6	K5	33	K8	K6	K2	625	K1
Sept 78	K120	36	K6	K5	K15	K8	265	K2	K50	K1
Oct 78	259	818	K6	K5	K15	K8	24	K2	119	K1
Nov 78	212	9	8	K5	K15	K8	8	K2	127	K1
Dec 78	2270	46	K6	K5	62	K8	42	K2	607	K1
Jan 79	167	K6	K6	K5	20	22	K6	K2	142	K1
Feb 79	210	K6	K6	K5	K15	K8	K6	K2	K50	K1
Mar 79	296	10	K6	K5	K15	K8	11	K2	109	K1
Apr 79	124	9	K6	K5	K15	K8	K6	K2	K50	K1
May 79	193	8	K6	K5	K15	K8	7	K2	K50	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	627	19	K6	K5	K15	K8	14	K2	288	K1
Average	407	89	K6	K5	16	K8	35	K2	192	K1
High	2270	818	8	K5	62	22	265	K2	625	K1
Low	K120	K6	K6	K5	K15	K8	K6	K2	K50	K1

Station Location Baraga, Michigan

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance umhos/cm	pH
	"No Add"	HNO_3	H_2SO_4	Average		
Aug 78	7100	7100	7100	7100	-	-
Sept 78	6700	6700	6670	6800	16	4.4
Oct 78	900	900	900	900	34	4.4
Nov 78	1300	4100	4300	3233	16	4.7
Dec 78	3350	3350	3040	3247	14	4.4
Jan 79	3100	2850	3160	3037	20	4.3
Feb 79	2300	2260	2250	2270	25	4.2
Mar 79	6000	5500	5750	5750	21	3.8
Apr 79	3000	3000	3000	3000	30	4.6
May 79	4120	4340	4520	4327	45	4.1
June 79	7000	6950	3350	5766	12	4.8
July 79	400	4320	2200	3786	25	3.5
Average	4105	4400	3853	4407	25	4.4
High	7100	7100	7100	7100	45	4.6
Low	900	900	900	900	14	3.8

Station Location Baraga, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Suspr. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	K.1	K1.2
Sept 78	K1	1	K5	K10	K5	0.3	K1.2
Oct 78	1	5	K5	22	K5	2.0	K1.2
Nov 78	K1	3	79	10	K5	K.1	K1.2
Dec 78	1	1.5	K5	8	K5	K.1	K1.2
Jan 79	K1	1.4	K5	12	5.1	0.6	2.5
Feb 79	1.1	1.3	8	16	K5	K0.1	K1.2
Mar 79	K1	2.6	6.3	14	K5	K.1	K1.2
Apr 79	K1	4.0	8	20	K5	.2	K1.2
May 79	K1	6.6	9	29	K5	K.1	K1.2
June 79	K1	1.9	7	8	-	-	-
July 79	K1	3.4	K5	16	K5	K.1	K1.2
Average	K1	3.0	14	16	K5	.44	K1.2
High	1.1	6.6	79	29	K5	2.0	K1.2
Low	K1	1	K5	K10	K5	K.1	K1.2

Station Location Baraga, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.22	0.33	0.30	0.06	K0.1
Oct 78	0.52	0.87	0.72	0.66	0.2
Nov 78	0.10	0.21	0.30	K.02	0.1
Dec 78	.08	.34	.48	.03	K.1
Jan 79	K.03	K0.05	0.46	K0.02	K.1
Feb 79	0.09	0.35	1.01	K0.02	0.1
Mar 79	0.11	0.28	0.39	K0.02	K.1
Apr 79	0.69	0.89	0.57	0.04	0.1
May 79	0.09	1.75	0.49	0.15	0.1
June 79	0.32	0.60	0.22	K.02	K.1
July 79	-	-	-	-	K.1
Average	0.26	0.63	0.28	0.10	0.1
High	0.69	1.75	1.01	0.66	0.1
Low	K.03	K0.05	0.30	K0.02	K.1

Station Location Baraga, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	137	K80	K6	K1	K2	K2	K5	K9	K.1
Sept 78	177	K80	K6	K1	K2	K2	K5	K9	K.1
Oct 78	659	K80	7	K1	K2	K2	16	19	K.1
Nov 78	236	K80	K6	K1	K2	K2	K5	K9	K.1
Dec 78	116	K80	7	K1	4	K2	K5	K9	K.1
Jan 79	468	186	8	K1	K2	K2	K5	13	-
Feb 79	131	K80	K6	K1	K2	K2	K5	K9	K.1
Mar 79	K90	K80	K6	K1	K2	K2	K5	K9	K.1
Apr 79	513	K80	6	K1	K2	K2	K5	K9	K.1
May 79	307	K80	6	K1	K2	K2	K5	9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	361	K80	K6	K1	K2	K2	K5	7	-
Average	286	K80	K6	K1	K2	K2	K5	K9	K.1
High	659	186*	8	K1	4	K2	16	19	K.1
Low	K90	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Baraga, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	121	8	9	K5	27	K8	K6	K2	57	K1
Sept 78	K120	9	9	K5	26	K8	18	K2	164	K1
Oct 78	912	51	K6	K5	K15	K8	84	K2	537	K1
Nov 78	209	K6	K6	K5	K15	K8	15	K2	66	K1
Dec 78	K120	K6	K6	K5	21	K8	9	K2	89	K1
Jan 79	506	17	9	K5	32	K8	16	K2	163	K1
Feb 79	127	K6	K6	K5	K15	K8	K6	K2	200	K1
Mar 79	K120	K6	K6	K5	K15	K8	K6	K2	K50	K1
Apr 79	618	9	K6	K5	K15	K8	16	K2	K50	K1
May 79	262	10	K6	K5	38	K8	7	K2	K50	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	335	10	K6	K5	K15	K8	9	K2	K50	K1
Average	296	11	K6	K5	22	K8	16	K2	194	K1
High	618	51	9	K5	38	K8	84	K2	537	K1
Low	K120	K6	K6	K5	K15	K8	K6	K2	57	K50

Station Location Houghton, Michigan

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type "No Add"	HNO_3	H_2SO_4	Average	Specific Conductance umhos/cm	pH
Aug 78	4760	4750	4580	4763	-	-
Sept 78	2500	2560	2720	2593	15	4.7
Oct 78	1260	1310	1310	1293	115	5.2
Nov 78	6100	6370	6580	6350	-	-
Dec 78	-	-	-	-	-	-
Jan 79	-	-	-	-	17	4.9
Feb 79	5860	5930	5550	5780	13	4.6
Mar 79	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-
May 79	-	-	-	-	-	-
June 79	-	-	-	-	-	-
July 79	-	-	-	-	-	-
Average	4096	4184	4148	4156	40	4.9
High	6100	6370	6580	6350	115	5.2
Low	1260	1310	1310	1293	13	4.6

Station Location Houghton, Michigan

Parameter Concentrations
Units - mg/1
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	0.2	K1.2
Sept 78	K1	3	K5	K10	K5	K0.1	K1.2
Oct 78	K1	3	17	75	K5	0.5	K1.2
Nov 78	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	K1	1.6	4.16	10	K5	K0.1	K1.2
Feb 79	K1	1.9	K5	9	K5	0.9	K1.2
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	K1	2.4	6.54	31	K5	.34	K1.2
High	K1	3	17	75	K5	0.90	K1.2
Low	K1	1.6	K5	K10	K5	K0.10	K1.2

Station Location Houghton, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.45	0.75	0.85	0.02	0.1
Oct 78	0.46	0.81	0.55	0.05	0.1
Nov 78	-	-	-	-	-
Dec 78	-	-	-	-	-
Jan 79	0.05	0.23	0.34	0.52	K.1
Feb 79	0.10	0.15	0.36	K0.02	0.2
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	0.27	0.49	.53	.20	.1
High	0.46	0.81	.85	.52	0.2
Low	0.05	0.15	.34	K0.02	K.1

Station Location Houghton, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	295	K80	9	K1	K2	K2	11	18	1.3
Sept 78	186	K80	7	K1	K2	K2	K5	K9	0.3
Oct 78	281	K80	K6	K1	K2	K2	K5	K9	K.1
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	161	K80	K6	K1	K2	K2	K5	K9	K.1
Feb 79	102	K80	K6	K1	K2	K2	10	K9	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	205	K80	5	K1	K2	K2	6	K9	0.4
High	295	K80	9	K1	K2	K2	11	18	1.3
Low	102	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Houghton, Michigan

Parameter Concentrations

Units - ug/l

1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	248	11	7	K5	65	21	11	K2	103	K1
Sept 78	143	12	K6	K5	17	K8	85	K2	112	K1
Oct 78	240	26	K6	K5	K15	K6	18	K2	148	K1
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	125	K6	K6	K5	K15	22	K6	K2	86	K1
Feb 79	129	8	K6	10	K15	K8	K6	K2	137	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	177	14	K6	K5	21	11	24	K2	117	K1
High	248	26	7	10	65	22	85	K2	148	K1
Low	125	K6	K6	K5	K15	K6	K6	K2	86	K1

Station Location Beaver Island, Michigan

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	6860	7000	7100	7000	-	-
Sept 78	1800	3970	5200	3657	16	5.7
Oct 78	4260	4100	4100	4153	16	4.7
Nov 78	2800	1600	2600	2333	28	4.5
Dec 78	2400	2400	2450	2417	22	4.2
Jan 79	800	800	800	800	30	4.6
Feb 79	1700	1800	1650	1717	470	3.2
Mar 79	4700	4650	4600	4650	13	4.4
Apr 79	3300	3800	3900	3667	22	4.7
May 79	3050	3200	2650	2967	32	5.5
June 79	3200	3800	3850	3616	17	5.5
July 79	1800	2360	2120	2100	-	5.7
Average	3053	3290	3906	3336	77	4.5
High	6860	7000	7100	7000	470	5.7
Low	800	800	800	800	13	3.2

Station Location Beaver, Island

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	0.7	K1.2
Sept 78	K1	4	K5	15	K5	0.2	K1.2
Oct 78	1	3	K5	10	K5	0.2	K1.2
Nov 78	1	4.4	13	18	K5	0.8	K1.2
Dec 78	K1	1.3	6	14	K5	0.2	K1.2
Jan 79	1.1	2.5	1.96	20	K5	0.6	K1.2
Feb 79	K1	16.6	K5	306	K5	2.0	K1.2
Mar 79	K1	2.5	5.3	8	K5	K.1	K1.2
Apr 79	K1	2.9	K5	14	K5	K.1	K1.2
May 79	K1	5.2	17	21	K5	.3	K1.2
June 79	K1	2.6	K5	11	-	-	-
July 79	-	-	-	-	K5	1.0	K1.2
Average	K1	4.7	6.0	51	K5	0.7	K1.2
High	1.1	16.6	17	306	K5	2.0	K1.2
Low	K1	1.3	K5	8	K5	0.2	K1.2

Station Location Beaver Island, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.54	0.56	0.37	K0.02	0.1
Oct 78	0.32	0.33	0.52	0.02	0.1
Nov 78	0.30	0.66	0.40	0.05	0.1
Dec 78	0.35	0.60	0.94	K0.02	0.1
Jan 79	0.36	0.69	0.14	0.02	K.1
Feb 79	0.20	0.58	1.18	0.04	K.1
Mar 79	0.49	0.59	0.59	0.02	0.1
Apr 79	0.40	0.67	0.44	0.03	K.1
May 79	1.27	1.42	0.97	0.07	0.1
June 79	0.47	0.67	144.0*	0.07	K.1
July 79	0.58	1.16	0.71	0.10	0.1
Average	0.47	0.68	0.63	0.03	.08
High	1.27	1.42	144.0*	.07	0.1
Low	0.20	0.33	0.14	K0.02	K.1

*Not averaged, probably acid contamination.

Station Location Beaver Island, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	390	107	9	K1	K2	K2	K5	22	K.1
Sept 78	190	K80	13	K1	K2	K2	6	K9	0.1
Oct 78	K90	K80	K6	K1	K2	K2	K5	K9	K.1
Nov 78	332	K80	K6	K1	K2	K2	7	12	K.1
Dec 78	414	K80	K6	K1	K2	K2	K5	K9	K.1
Jan 79	247	83	K6	K1	K2	K2	K5	K9	K.1
Feb 79	213	K80	K6	K1	K2	K2	K5	K9	-
Mar 79	175	K80	K6	K1	K2	K2	K5	K9	K.1
Apr 79	230	K80	K6	K1	K2	K2	K5	K9	-
May 79	K90	K80	K6	K1	K2	K2	K5	K9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	170	K80	K6	K1	K2	K2	K5	7	-
Average	223	K80	K6	K1	K2	K2	K5	1.0	K.1
High	414	107	13	K1	K2	K2	7	22	.1
Low	K90	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Beaver Island, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	411	16	K6	K5	84	K8	14	K2	149	K1
Sept 78	143	127	K6	K5	27	K8	16	K2	K50	K1
Oct 78	K120	11	K6	K5	K15	K8	K6	K2	98	K1
Nov 78	260	10	K6	K5	18	K8	12	K2	459	K1
Dec 78	383	K6	7	K5	48	K8	12	K2	205	K1
Jan 79	132	K6	13	K5	44	44	K6	K2	162	K1
Feb 79	273	14	K6	K5	K15	K8	K6	K2	292	K1
Mar 79	185	K6	K6	K5	K15	K8	K6	K2	K50	K1
Apr 79	143	K6	K6	K5	K15	K8	10	K2	62	K1
May 79	K120	7	K6	K5	K15	K8	K6	K2	K50	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	195	10	K6	K5	K15	K8	K6	K2	K50	K1
Average	186	19	K6	K5	24	K8	7	K2	158	K1
High	411	127	13	K5	84	44	16	K2	459	K1
Low	K120	K6	K6	K5	K15	K8	K6	K2	K50	K1

Station Location Copper Harbor, Michigan

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Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type "No Add"	HNO_3	H_2SO_4	Average	Specific Conductance umhos/cm	pH
Aug 78	-	3100	3200	3150	-	-
Sept 78	2480	2350	2440	2423	-	-
Oct 78	1225	1225	-	1225	-	-
Nov 78	500	500	500	500	110	5.5
Dec 78	11000	11000	11000	11000	52	4.0
Jan 79	4150	3860	3260	3757	23	4.7
Feb 79	10680	10520	11200	10800	34	4.1
Mar 79	500	500	500	500	22	4.5
Apr 79	2650	2840	2680	2723	24	4.5
May 79	3380	2380	2380	2700	22	4.9
June 79	5960	4420	5560	5313	14	5.3
July 79	2960	3000	2880	2946	32	3.8
Average	3684	3808	3842	3867	44	4.6
High	11000	11000	11200	11000	110	5.5
Low	500	500	500	500	22	4.0

Station Location Copper Harbor, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	K.1	K1.2
Sept 78	-	-	-	-	-	-	-
Oct 78	-	-	-	-	K4	1.3	K.9
Nov 78	K1	K1	6	72	K4	0.2	K.9
Dec 78	K1	2.5	K4	34	K4	0.1	K.9
Jan 79	K1	1.9	K4	16	K4	0.2	K.9
Feb 79	K1	1.7	K4	22	K4	K0.1	K.9
Mar 79	K2	3.1	K4	14	K4	K.1	K.9
Apr 79	K2	2.8	K4	16	K4	K.1	K.9
May 79	K1	4.0	7	14	K4	1.1	K.9
June 79	K1	2.3	8	9	-	-	-
July 79	K1	3.3	8	21	K4	.2	K.9
Average	K1	2.9	2.7	29	K4	.3	K.9
High	K1	4.0	7	72	K4	1.3	K.9
Low	K1	K1	K4	14	K4	K0.1	K.9

Station Location Copper Harbor, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	-	-	-	-	-
Nov 78	0.14	0.31	0.33	K.02	K.1
Dec 78	0.04	0.30	0.31	0.03	0.1
Jan 79	0.05	0.25	0.41	0.03	K.1
Feb 79	0.21	0.34	0.84	K0.02	K.1
Mar 79	K0.03	K0.05	0.14	K0.02	K.1
Apr 79	0.26	0.37	0.35	K0.02	K.1
May 79	0.63	1.19	0.58	0.06	0.1
June 79	0.64	1.30	0.39	0.08	K.1
July 79	0.55	1.33	0.52	0.12	K.1
Average	.22	0.58	0.40	.02	K.1
High	0.64	1.30	0.84	0.08	0.1
Low	K0.03	K0.05	0.14	K0.02	K.1

Station Location Copper Harbor, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	133	111	11	K1	3	K2	K5	14	0.5
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	321	K80	K6	K1	K2	K2	K5	K9	K.1
Nov 78	2320	K80	15	K1	K5	K5	K5	K9	K.1
Dec 78	195	K80	13	K1	K2	K2	K5	K9	K.1
Jan 79	188	116	K6	K1	K2	K2	K5	K9	K.1
Feb 79	K90	93	K6	K1	K2	K2	K5	K9	K.1
Mar 79	K90	K80	K6	K1	K2	K2	K5	K9	K.1
Apr 79	217	K80	K6	K1	K2	K2	K5	7	K.1
May 79	787	290	7	K1	K2	K2	11	K9	-
June 79	-	-	-	-	-	-	-	-	-
July 79	330	K80	K6	K1	K2	K2	K5	7	-
Average	458	85	6	K1	K2	K2	K5	K9	K.1
High	2320	290	15	K1	3	K2	K5	14	K.1
Low	K90	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Copper Harbor, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	183	10	K6	K5	82	23	K6	K2	98	K1
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	535	22	K6	K5	K15	K8	52	3	95	K1
Nov 78	201	K6	K6	K5	30	K8	250	4	1220	K1
Dec 78	123	K6	8	K5	17	K8	K6	K2	579	K1
Jan 79	K120	K6	K6	K5	28	22	K6	K2	226	K1
Feb 79	K120	K6	K6	K5	K15	K8	K6	K2	K50	K1
Mar 79	359	K6	K6	K5	K15	K8	K6	K2	136	K1
Apr 79	208	6	K6	K5	K15	K8	7	K2	92	K1
May 79	650	21	11	K5	K15	K8	19	K2	159	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	335	10	K6	K5	K15	K8	9	K2	K50	K1
Average	271	8	K6	K5	28	8	35	K2	266	K1
High	650	22	11		82	23	250	4	1220	K1
Low	K120	K6	K6	K5	K15	K8	K6	K2	K50	K1

Station Location Ontanagon, Michigan

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO3	H_2SO_4	Average	umhos/cm	pH
Aug 78	5500	5500	5500	5500	15	5.1
Sept 78	2000	2000	2000	2000	-	-
Oct 78	2000	1600	1200	1600	1140	5.7
Nov 78	3000	3000	3000	3000	480	3.0
Dec 78	3400	3800	3600	3600	26	4.1
Jan 79	2700	3000	2900	2867	42	4.1
Feb 79	3000	3000	3000	3000	38	4.1
Mar 79	1700	3400	1700	2300	4	7.9
Apr 79	1500	1560	1400	1500	90	4.0
May 79	7000	7000	7000	7000	64	4.0
June 79	500	500	500	500	37	4.8
July 79	2000	500	500	1000	20	4.8
Average	2858	2905	2691	3236	229	4.8
High	7000	7000	7000	7000	1140	7.9
Low	500	500	500	1500	4	3.0

Station Location Ontanagon, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	1	7	K5	20	K5	0.2	K1.2
Sept 78	-	-	-	-	-	-	-
Oct 78	K1	4	23	-	K5	0.4	K1.2
Nov 78	K1	13	22	-	K5	1.0	K1.2
Dec 78	K1	1	K5	18	K5	K.2	K1.2
Jan 79	2.2	3.9	K5	26	K5	K0.1	K1.2
Feb 79	1.3	3.3	K5	25	K5	K0.1	K1.2
Mar 79	K1	3.9	20.2	4	K5	.2	K1.2
Apr 79	K1	5.7	22	59	K5	.3	K1.2
May 79	K1	11.1	51	41.6	K5	.3	K1.2
June 79	K1	5.6	35	24	-	-	-
July 79	K1	3.2	16	18	K5	.9	K1.2
Average	K1	5.2	12	20	K5	.1	K1.2
High	2.2	13	23	59	K5	1.0	K1.2
Low	K1	1	K5	4	K5	K.1	K1.2

Station Location Ontonagon, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.57	1.00	0.32	0.06	0.3
Sept 78	0.57	1.00	0.32	0.06	-
Oct 78	1.12	4.92	0.58	0.22	1.0
Nov 78	0.24	0.56	0.31	.03	0.2
Dec 78	0.14	0.45	0.33	.03	0.1
Jan 79	0.05	K0.05	0.68	K0.02	K.1
Feb 79	0.11	0.39	1.10	K0.02	0.1
Mar 79	0.12	0.11	0.48	K0.02	0.1
Apr 79	0.89	2.37	0.53	0.18	0.3
May 79	0.66	1.22	0.85	0.1	0.9
June 79	1.14	2.29	0.81	0.17	0.2
July 79	7.81	9.94	0.53	1.27	0.1
Average	.42	1.35	.52	.07	.3
High	1.14	4.92	1.10	.22	1.0
Low	.05	K.05	.31	K.02	K.1

Station Location Ontonogon, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	182	K80	7	K1	K2	K2	K5	111	K.1
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	554	K80	9	K1	K2	K2	K5	177	K.1
Nov 78	2320	K80	15	K1	K2	K2	K5	274	K.1
Dec 78	194	K80	6	K1	K2	K2	K5	52	-
Jan 79	168	K80	K6	K1	K2	K2	10	43	K.1
Feb 79	126	K80	K6	K1	K2	K2	K5	110	K.1
Mar 79	K90	139	K6	K1	K2	K2	K5	53	K.1
Apr 79	1040	K80	10	K1	3	K2	K5	303	0.1
May 79	775	301	8	K1	K2	K2	9	126	
June 79	-	-	-	-	-	-	-	-	-
July 79	757	327	10	K1	K2	K2	K5	230	-
Average	616	104	7	K1	K2	K2	K5	148	K.1
High	2320	327	15	K1	3	K2	10	303	.1
Low	126	K80	K6	K1	K2	K2	K5	43	K.1

Station Location Ontonagon, Michigan

Parameter Concentrations

Units - ug/1

1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	393	22	7	K5	K15	K8	7.6	K2	K50	K1
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	838	24	K6	K5	K15	K8	52	K2	K50	K1
Nov 78	3160	67	10	K5	30	K8	250	4	459	K1
Dec 78	279	7	K6	K6	21	K8	14	K2	124	K1
Jan 79	210	K6	16	29	60	K8	9	5	K50	3
Feb 79	127	K6	K6	K5	K15	K8	7	K2	K50	K1
Mar 79	240	6	K6	K5	K15	K8	9	K2	K50	K1
Apr 79	1060	26	K6	K5	K15	K8	36	K2	57	K1
May 79	1120	30	K6	K5	K15	K8	58	K2	K50	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	1260	36	K6	K5	K15	K8	67	K2	68	K1
Average	869	30	K6	5	16	K8	51	2	86	K1
High	3160	67	16	29	60	K8	250	5	459	3
Low	127	K6	K6	K5	K15	K8	K7	K2	K50	K1

Station Location St. Joseph, Michigan

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type "No Add"	HNO_3	H_2SO	Average	Specific Conductance umhos/cm	pH
Aug 78	2450	2000	2000	2150	-	-
Sept 78	6500	6500	6500	6500	47	4.5
Oct 78	1100	2320	1950	1790	36	5.1
Nov 78	2200	2380	2080	2220	87	3.7
Dec 78	3800	4100	4460	4120	65	3.7
Jan 79	4560	3870	3850	4093	104	3.6
Feb 79	1140	1140	1180	1140	57	4.0
Mar 79	-	3200	2980	3100	-	-
Apr 79	3400	3980	-	3700	175	3.7
May 79	1010	1050	1020	1027	133	3.8
June 79	500	500	500	500	210	3.1
July 79	-	-	-	-	-	-
Average	2660	2821	2652	2984	101	3.5
High	4560	6500	4460	4120	210	5.1
Low	500	500	500	1027	36	3.6

Station Location St. Joseph, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	0.3	K1.2
Sept 78	1	6	10	K10	K5	.2	K1.2
Oct 78	1	5	8	23	K5	0.5	K1.2
Nov 78	K1	11.2	7	57	15.6	4.1	2.7
Dec 78	K1	6	7	42	K5	0.4	K1.2
Jan 79	1.1	8.1	2.16	68	K5	0.2	2.0
Feb 79	1.9	5.4	K5	36	K5	K0.1	K1.2
Mar 79	-	-	-	-	K5	.7	K1.2
Apr 79	K1	23.6	K5	114	K5	.5	K1.2
May 79	K1	16.2	42	86.5	K5	1.4	K1.2
June 79	K1	28	15	137	-	-	-
July 79	-	-	-	-	-	-	-
Average	1	9.3	11	63	4.4	.95	1.1
High	1.9	23.6	42	137	15.6	4.1	2.7
Low	K1	5	K5	K10	K5	K0.1	K1.2

Station Location St. Joseph, Michigan

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.5	2.48	0.70	K.02	-
Sept 78	1.51	2.34	1.25	.17	.8
Oct 78	1.17	1.45	1.21	0.04	0.3
Nov 78	0.77	1.11	1.88	0.04	0.2
Dec 78	.40	.67	.75	.02	0.3
Jan 79	0.17	0.23	0.66	0.08	0.1
Feb 79	0.68	0.92	2.02	K0.02	0.2
Mar 79	0.53	1.44	1.93	0.05	-
Apr 79	-	-	-	-	0.2
May 79	3.74	3.60	3.00	0.30	0.4
June 79	0.99	2.1	2.04	0.11	0.4
July 79	-	-	-	-	-
Average	.84	1.33	1.3	.05	.3
High	1.51	2.48	2.02	.17	.8
Low	.17	.23	.66	K.02	.1

Station Location St. Joseph, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	214	193	K6	K1	K2	K2	K5	K9	K.1
Sept 78	150	K80	7	K1	K2	K2	K5	K9	.1
Oct 78	380	K80	9	K1	K2	K2	K5	K9	K.1
Nov 78	472	103	10	K1	K2	K2	8	58	K.1
Dec 78	606	93	10	K1	K2	K2	K5	13	0.2
Jan 79	298	177	7	K1	K2	K2	K5	K9	K.1
Feb 79	955	K80	K6	K1	K2	K2	K5	K9	0.2
Mar 79	581	K80	8	K1	K2	K2	K5	K9	0.2
Apr 79	434	K80	7	K1	K2	K2	K5	K1	K.1
May 79	1170	K80	17	K1	K2	K2	34*	14	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	526	81	8	K1	K2	K2	K5	12	.11
High	1170	193	17	K1	K2	K2	34	58	.2
Low	150	K80	K6	K1	K2	K2	K5	K9	K.1

*Not Averaged

Station Location St. Joseph, Michigan

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	253	19	K6	K5	56	21	8	K2	64	K1
Sept 78	K120	15	K6	K5	34	K8	7	K2	62	K1
Oct 78	389	27	K6	K5	44	K8	17	K2	183	K1
Nov 78	571	58	K6	K5	74	K8	17	3	603	K1
Dec 78	1290	40	K6	K5	65	K8	22	K2	184	K1
Jan 79	402	20	8	K5	51	44	8	K2	134	K1
Feb 79	927	17	K6	K5	K15	K8	17	K2	115	K1
Mar 79	895	30	K6	K5	42	K8	14	K2	K50	K1
Apr 79	527	21	K6	K5	K15	K8	10	K2	85	K1
May 79	1260	76	12	K5	115	K8	22	K2	177	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	657	32	K6	K5	50	10	14	K2	163	K1
High	1290	76	12	K5	115	44	22	3	603	K1
Low	K120	15	K6	K5	K15	K8	7	K2	62	K1

Station Location Chicago, Illinois - #1

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type "No Add"	HNO_3	H_2SO_4	Average	Specific Conductance umhos/cm	pH
Aug 78	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-
Oct 78	300	1150	1120	857	126	6.7
Nov 78	1005	1150	1330	1160	194	6.4
Dec 78	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-
May 79	-	-	-	-	-	-
June 79	-	-	-	-	-	-
July 79	-	-	-	-	-	-
Average	1005	1150	1225	1000	160	6.6
High	1005	1150	1330	1160	194	6.7
Low	300	1150	1120	857	126	6.4

Station Location Chicago, Illinois - #1

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-
Oct 78	3	23	30	82	18.7	3.3	K1.2
Nov 78	3.9	57.5	50	126	27.6	5.1	2.6
Dec 78	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	3.5	40.3	40	104	23.2	4.2	1.6
High	3.9	57.5	50	126	27.6	5.1	2.6
Low	3	23	30	82	18.7	3.3	K1.2

Station Location Chicago, Illinois - #1

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	3.29	6.40	1.56	0.93	2.4
Nov 78	3.18	5.17	2.60	0.18	3.1
Dec 78	-	-	-	-	-
Jan 79	-	-	-	-	-
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	3.24	5.79	2.08	.56	2.8
High	3.29	6.40	2.60	.93	3.1
Low	3.18	5.17	1.56	.18	2.4

Station Location Chicago, Illinois - #1

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	1440	K80	35	K1	K2	K2	41	51	K.1
Nov 78	4110	127	79	K1	K2	K2	61	86	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	2775	84	57	K1	K2	K2	51	69	K.1
High	4110	127	79	K1	K2	K2	61	86	K.1
Low	1440	K80	35	K1	K2	K2	41	51	K.1

Station Location Chicago, Illinois - #1

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	4130	516	K6	K5	196	K8	79	15	430	K1
Nov 78	17100	1380	25	K5	393	32	196	30	872	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	10615	948	14	K5	295	18	138	23	651	K1
High	17100	1380	25	K5	393	32	196	30	872	K1
Low	4130	516	K6	K5	196	K8	79	15	430	K1

Station Location Chicago, Illinois - #2

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-
Oct 78	1090	1340	1320	1250	125	6.7
Nov 78	1040	-	-	-	109	6.1
Dec 78	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-
May 79	-	-	-	-	-	-
June 79	-	-	-	-	-	-
July 79	-	-	-	-	-	-
Average	1065	1340	1320	1250	117	6.4
High	1090	1340	1320	1250	125	6.7
Low	1040	1340	1320	1250	109	6.1

Station Location Chicago, Illinois - #2

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-
Oct 78	2	23	30	81	22.6	8.3	K1.2
Nov 78	2.2	23.3	53	71	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-		-	-	-
July 79	-	-	-	-	-	-	-
Average	2.1	23.2	42	76	22.6	8.3	K1.2
High	2.2	23.3	53	81	22.6	8.3	K1.2
Low	2	23	30	71	22.6	8.3	K1.2

Station Location Chicago, Illinois - #2

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	3.26	7.15	1.54	0.17	2.4
Nov 78	1.80	4.18	1.22	0.31	2.1
Dec 78	-	-	-	-	-
Jan 79	-	-	-	-	-
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	2.53	5.66	1.38	.24	2.3
High	3.26	7.15	1.54	.31	2.4
Low	1.80	4.18	1.22	.17	2.1

Station Location Chicago, Illinois - #2

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	1830	K80	47	K1	K2	K2	64	53	K.1
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average									
High									
Low									

Station Location Chicago, Illinois - #2

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	5990	717	K6	38	258	K8	91	19	870	2
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average										
High										
Low										

Station Location Willmette, Illinois

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	3000	3000	3000	3000	-	-
Sept 78	3000	3000	3000	3000	21	4.6
Oct 78	500	500	500	500	78	6.5
Nov 78	2820	2690	2700	2737	136	5.6
Dec 78	3690	2090	3640	3140	37	5.2
Jan 79	3420	3020	3200	3213	80	5.4
Feb 79	1280	1360	1305	1315	100	4.3
Mar 79	1212	5000	4830	3681	31	6.3
Apr 79	3000	-	3210	3100	360	3.4
May 79	1500	-	-	1500	56	6.1
June 79	3250	1486	4068	-	-	-
July 79	2370	3096	-	-	21	6.3
Average	2705	2576	2945	2519	105	5.2
High	3690	5000	4830	3681	360	6.5
Low	500	500	500	500	21	3.4

Station Location Wilmette, Illinois

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	K1	K1.2
Sept 78	K1	4	K5	K10	K5	.5	1.3
Oct 78	2	10	22	51	13.8	4.6	K1.2
Nov 78	3.5	17	24	88	9.7	3.1	1.4
Dec 78	K1	1.4	K5	24	K5	.4	K1.2
Jan 79	16.4	4.5	1.36	52	K5	1.5	13.9
Feb 79	12.7	9.4	7	64	8.0	4.4	58.5
Mar 79	K1	4.3	52	20	K5	1.3	K1.2
Apr 79	K1	0.6	26	234	K5	1.6	K1.2
May 79	1.1	6.7	17	36	10	3.9	K1.2
June 79	-	-	-	-	-	-	-
July 79	K.1	2.8	11	36	-	-	-
Average	4.6	6.4	17.2	76	5.9	2.4	11
High	16.4	17	52	234	13.8	4.6	585
Low	K1	.6	K5	K10	K5	K1	K1.2

Station Location Wilmette, Illinois

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.82	1.29	0.70	0.07	-
Sept 78	.55	.74	.61	K0.02	.1
Oct 78	3.25	5.04	2.25	0.16	0.9
Nov 78	2.04	3.19	3.58	0.11	0.7
Dec 78	.41	.68	.76	.03	K.1
Jan 79	0.24	0.74	0.78	0.07	0.1
Feb 79	0.64	0.85	2.54	0.05	0.2
Mar 79	0.49	0.56	0.60	0.04	0.1
Apr 79	0.77	1.51	0.78	0.14	-
May 79	-	-	-	-	0.5
June 79	1.37	2.96	1.28	0.14	-
July 79	1.44	3.94	2.03	0.15	0.3
Average	1.02	1.62	1.4	.08	.4
High	3.25	5.04	3.58	.16	.9
Low	.24	.56	.60	K0.02	K.1

Station Location Wilmette, Illinois

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	357	K80	9	K1	K2	K2	K5	11	K.1
Sept 78	264	K80	9	K1	K2	K2	K5	K9	K.1
Oct 78	900	K80	22	K1	K2	K2	6	26	K.1
Nov 78	907	98	22	K1	4	K2	8	30	K.1
Dec 78	219	K80	K6	K1	3	K2	K5	11	K.1
Jan 79	283	K80	10	K1	K2	K2	K5	39	K.1
Feb 79	727	K80	21	K1	K2	K2	K5	31	0.4
Mar 79	358	K80	11	K1	K2	K2	K5	15	K.1
Apr 79	1480	K80	20	K1	K2	K2	K5	15	K.1
May 79	2310	K80	45	K1	10	K2	16	58	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	780	K80	17	K1	2	K2	5	24	K.1
High	2310	98	22	K1	4	K2	16	58	.4
Low	219	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Wilmette, Illinois

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	511	19	9	K5	61	10	12	K2	71	K1
Sept 78	322	23	K6	K5	36	K8	10	K2	56	K1
Oct 78	1210	74	K6	K5	195	K8	35	6	169	2
Nov 78	1030	66	K6	K5	247	K8	30	5	542	K1
Dec 78	336	13	11	K5	66	K8	8	K2	227	K1
Jan 79	399	30	K6	K5	100	44	9	K2	141	K1
Feb 79	1320	73	K6	K5	137	K8	14	K2	375	K1
Mar 79	698	29	K6	K5	37	K8	25	K2	150	-
Apr 79	2570	73	K6	K5	46	K8	36	K2	169	-
May 79	6750*	126	12	K5	311	K8	61	8	1670*	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	932	55	K6	K5	124	9	24	3	211	K1
High	6750	126	12	K5	311	44	61	8	1670	2
Low	322	13	K6	K5	36	K8	8	K2	56	K1

Station Location Zion, Illinois

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	4500	4600	4600	4567	-	-
Sept 78	-	4100	4300	4200	-	-
Oct 78	500	500	-	500	76	6.2
Nov 78	-	-	9400	9400	-	-
Dec 78	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-
May 79	-	-	-	-	-	-
June 79	-	-	-	-	-	-
July 79	-	-	-	-	-	-
Average	2500	3067	6100	4667	76	6.2
High	4500	4600	9400	7500	76	6.2
Low	500	500	4300	500	76	6.2

Station Location Zion, Illinois

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	1.0	K1.2
Sept 78	-	-	-	-	K5	1.5	K1.2
Oct 78	2	10	35	49	5.9	1.9	K1.2
Nov 78	-	-	-	-	6.1	3.0	K1.2
Dec 78	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	2	10	35	49	4.3	1.9	K1.2
High	2	10	35	49	6.1	3.0	K1.2
Low	2	10	35	49	K5	1.0	K1.2

Station Location Zion, Illinois

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.83	1.14	0.68	0.07	-
Sept 78	0.92	0.97	0.72	0.06	-
Oct 78	-	-	-	-	0.6
Nov 78	0.90	1.31	1.32	0.19	-
Dec 78	-	-	-	-	-
Jan 79	-	-	-	-	-
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	.88	1.14	.91	.11	.06
High	.92	1.31	1.32	.19	.06
Low	.83	.97	.68	.06	.06

Station Location Zion, Illinois

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	403	K80	9	K1	K2	K2	K5	16	K.1
Sept 78	249	K80	11	K1	K2	K2	K5	K9	.6
Oct 78	535	K80	K6	K1	3	K2	7	12	-
Nov 78	3620	91	27	K1	4	K2	15	22	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1112	K80	16	K1	2	K2	7	17	.3
High	3620	91	27	K1	4	K2	15	22	.6
Low	249	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Zion, Illinois

Parameter Concentrations
Units - ug/1
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	503	25	9	K5	48	K8	12	K2	163	K1
Sept 78	353	22	K6	K5	17	K8	21	K2	76	K1
Oct 78	809	35	K6	K5	90	K8	26	6	105	2
Nov 78	4990	72	8	8	163	K8	135	10	196	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	2913±	39	6	K5	80	K8	49	5	135	K1
High	4990	72	9	8	163	K8	135	10	196	2
Low	353	22	K6	K5	17	K8	12	K2	76	K1

Station Location Milwaukee, Wisconsin- #1

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	3200	2660	2420	2760	-	-
Sept 78	7000	6300	6200	6500	26	6.3
Oct 78	900	1650	1780	1200	64	6.5
Nov 78	1240	1360	1240	1240	60	6.2
Dec 78	-	-	-	-	-	-
Jan 79	5300	4630	5580	5170	44	6.0
Feb 79	-	500	-	500	-	7.0
Mar 79	4080	-	-	4080	46	6.4
Apr 79	5700	4730	5150	5193	25	5.8
May 79	1110	-	1110	1100	78	6.5
June 79	3580	3080	2960	-	-	-
July 79	-	-	-	-	-	-
Average	3568	2528	3305	3082	49	6.4
High	7000	6300	6200	6500	78	7.0
Low	900	500	1110	500	25	5.8

Station Location Milwaukee, Wisconsin - #1

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	6.2	1.7	K1.2
Sept 78	K1	4	K5	K10	K5	0.8	K1.2
Oct 78	1	10	32	42	5.9	1.9	K1.2
Nov 78	2.7	9.3	34	39	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	3.4	5.0	6.92	30	K5	1.5	2.5
Feb 79	-	-	-	-	12.5	5.2	2.8
Mar 79	K1	7.0	208	30	-	-	-
Apr 79	K1	4.4	6	16	K5	.5	K1.2
May 79	K1	9.6	83	50.7	14.3	4.4	K1.2
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.4	9.0	62	35	5.9	2.2	1.4
High	3.4	9.6	208	51	12.5	5.2	2.8
Low	K1	4	K5	K10	K5	0.8	K1.2

Station Location Milwaukee, Wisconsin - #1

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.14	1.9	1.57	0.12	-
Sept 78	0.76	1.11	0.84	0.02	0.1
Oct 78	0.89	1.32	0.94	0.33	0.5
Nov 78	0.73	1.32	1.16	0.09	0.4
Dec 78	-	-	-	-	-
Jan 79	0.71	0.80	0.92	K0.02	0.1
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	0.2
Apr 79	0.57	0.75	0.57	0.04	0.1
May 79	1.93	3.46	1.83	0.32	0.4
June 79	2.38	3.79	3.01	0.05	-
July 79	-	-	-	-	-
Average	1.14	1.79	1.36	.14	.26
High	2.38	3.79	3.01	0.33	0.5
Low	0.57	0.75	0.57	K0.02	0.1

Station Location Milwaukee, Wisconsin - #1

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	587	112	15	K1	K2	K2	.8	37	K.1
Sept 78	164	K80	8	K1	K2	K2	K5	15	0.8
Oct 78	535	K80	7	K1	K2	K2	7	12	K.1
Nov 78	-	-	-	-	-	-	-	-	0.7
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	618	K80	10	K1	K2	K2	K5	21	K.1
Feb 79	1940	K80	19	K1	K2	K2	40	22	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	322	K80	6	K1	K2	K2	K5	K9	-
May 79	2390	K80	32	K1	K2	K2	23	34	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	936	K80	14	K1	K2	K2	12	21	0.3
High	1940	112	15	K1	K2	K2	40	37	0.8
Low	164	K80	6	K1	K2	K2	K5	12	K.1

Station Location Milwaukee, Wisconsin - #1

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	966	40	9	7	97	20	26	4	109	K1
Sept 78	234	16	8	K5	41	K8	14	K2	121	K1
Oct 78	809	35	K6	K5	90	K8	26	6	105	2
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	536	23	9	K5	138	22	23	K2	191	K1
Feb 79	2270	64	11	41	188	K8	95	15	800	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	440	15	K6	K5	K15	K8	10	K2	51	K1
May 79	3190	107	K6	K5	147	K8	53	K2	315	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	1206	43	7	11	19	9	35	5	241	K1
High	2270	64	11	41	188	22	95	15	800	2
Low	234	15	K6	K5	K5	K8	10	K2	51	K1

Station Location Milwaukee, Wisconsin - #2

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type "No Add"	HNO_3	H_2SO_4	Average	Specific Conductance umhos/cm	pH
Aug 78	2560	3000	500	2100	-	-
Sept 78	5800	5800	5740	5800	28	6.1
Oct 78	1770	-	-	1776	42	6.4
Nov 78	1530	1530	1530	1530	66	6.2
Dec 78	-	-	-	-	-	-
Jan 79	4460	3970	3540	3990	55	5.9
Feb 79	500	500	500	500	44	2.7
Mar 79	1600	2920	3130	2550	77	7.0
Apr 79	4700	5440	5170	5103	24	5.8
May 79	1080	-	1080	1080	75	6.3
June 79	3070	500	3060	2200	-	-
July 79	-	-	-	-	-	-
Average	2707	3252	2695	2713	51	6.3
High	5800	5800	5740	5800	77	7.0
Low	500	500	500	500	24	5.8

Station Location Milwaukee, Wisconsin - #2

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	1.6	K1.2
Sept 78	K1	3	K5	K10	K5	1.1	K1.2
Oct 78	1	7	K5	27	-	-	-
Nov 78	2.7	7.6	26	43	8.6	3.7	1.3
Dec 78	-	-	-	-	-	-	-
Jan 79	4.5	3.9	7.96	36	K5	1.7	2.5
Feb 79	1.8	5.2	42	30	K5	0.4	K1.2
Mar 79	K1	3.7	76.7	50	K5	2.1	K1.2
Apr 79	K1	4.7	K5	16	K5	.5	K1.2
May 79	K1	9.8	41	49	12.6	4.4	K1.2
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.6	5.6	25	36	K5	1.7	1.1
High	4.5	9.8	76.7	50	K5	3.7	2.5
Low	K1	3	K5	K10	8.6	0.4	K1.2

Station Location Milwaukee, Wisconsin II

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.52	2.31	2.06	0.15	-
Sept 78	0.85	1.42	1.02	0.03	0.1
Oct 78	-	-	-	-	-
Nov 78	3.03	3.58	2.63	0.41	0.3
Dec 78	-	-	-	-	-
Jan 79	1.24	1.32	1.32	0.03	0.3
Feb 79	0.09	0.18	0.34	K0.02	0.3
Mar 79	0.76	0.88	0.89	0.06	0.3
Apr 79	0.56	0.82	0.59	0.03	0.1
May 79	2.48	3.82	1.49	0.20	0.3
June 79	3.02	4.94	3.79	0.01	-
July 79	-	-	-	-	-
Average	1.51	2.14	1.57	.12	.25
High	3.03	4.94	3.79	0.41	0.3
Low	0.09	0.18	0.34	K0.02	0.1

Station Location Milwaukee, Wisconsin - #2

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	543	71	14	K1	5	K2	11	19	K.1
Sept 78	952	K80	17	K1	K2	K2	8	10	K.1
Oct 78	-	-	-	-	-	-	-	-	-
Nov 78	1370	K80	13	K1	K2	3	30	18	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	468	K80	12	K1	K2	K2	K5	18	K.1
Feb 79	615	K80	10	K1	K2	K2	7	K9	K.1
Mar 79	1190	232	28	K1	K2	K2	19	16	-
Apr 79	330	85	14	K1	K2	K2	K5	K9	-
May 79	280	K80	32	K1	K2	K2	10	31	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1036	K80	18	K1	K2	K2	11	15	K.1
High	1370	232	17	K1	5	3	30	19	K.1
Low	330	K80	10	K1	K2	K2	K5	K9	K.1

Station Location Two Rivers, Wisconsin

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	2360	-	-	-	-	-
Sept 78	-	-	-	-	-	-
Oct 78	-	500	-	-	-	-
Nov 78	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-
Jan 79	3740	3740	3740	3740	41	4.3
Feb 79	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-
May 79	2200	-	-	2200	0	5.1
June 79	500	500	500	500	34	-
July 79	500	500	500	500	-	-
Average	1860	1316	1580	1735	38	4.7
High	3740	3740	3740	3740	41	5.1
Low	500	500	500	500	34	4.3

Station Location Two Rivers, Wisconsin

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-
Oct 78	-	-	-	-	K5	1.1	K1.2
Nov 78	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	K1	4.3	.16	28	K5	0.5	K1.2
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	K1	5.1	5	22.1	-	-	-
July 79	-	-	-	-	-	-	-
Average	K1	4.7	4.08	25	K5	.8	K1.2
High	K1	5.1	5	28	K5	1.1	K1.2
Low	K1	4.3	3.16	22	K5	.5	K1.2

Station Location Two Rivers, Wisconsin

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	-	-	-	-	-
Nov 78	-	-	-	-	-
Dec 78	-	-	-	-	-
Jan 79	0.60	0.96	1.33	K0.02	0.1
Feb 79	0.83	1.15	1.56	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	0.1
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	.72	1.06	1.45	K.02	.1
High	.83	1.15	1.56	K.02	.1
Low	.60	.96	1.33	K.02	.1

Station Location Two Rivers Wisconsin

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	488	K80	13	K1	K2	K2	K5	K9	K.1
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	552	220	K6	K1	K2	K2	K5	K9	K.1
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	520	130	8	K1	K2	K2	K5	K9	K.1
High	552	220	13	K1	K2	K2	K5	K9	K.1
Low	488	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Two Rivers, Wisconsin

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	493	29	K6	K5	17	K8	18	K2	62	K1
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	347	11	K6	K5	56	K8	9	K2	1090	K1
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	420	20	K6	K5	37	K8	14	K2	576	K1
High	493	29	K6	K5	56	K8	18	K2	1090	K1
Low	347	11	K6	K5	17	K8	9	K2	62	K1

Station Location Bayfield, Wisconsin

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	3500	3500	3500	3500	-	-
Sept 78	-	500	-	-	-	-
Oct 78	-	-	-	-	-	-
Nov 78	500	500	500	500	26	6.0
Dec 78	500	500	500	500	18	2.1
Jan 79	500	500	500	500	17	5.7
Feb 79	2000	2000	2000	2000	16	7.1
Mar 79	500	500	500	500	44	4.2
Apr 79	500	-	500	500	46	4.5
May 79	2000	2000	2000	2000	21	5.9
June 79	2000	2000	2000	2000	18	5.6
July 79	1500	1500	1500	1500	21	5.3
Average	1250	1250	1250	1250	28	5.6
High	3500	3500	3500	3500	46	7.1
Low	500	500	500	500	16	4.2

Station Location Bayfield, Wisconsin

Parameter Concentrations

Units - mg/l

1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K5	K.1	K1.2
Sept 78	-	-	-	-	K5	.4	K1.2
Oct 78	-	-	-	-	-	-	-
Nov 78	2.3	K3	57	17	K5	K0.1	K1.2
Dec 78	K1	K1	K5	12	K5	K.1	K1.2
Jan 79	1.3	K1	2.16	10	K5	0.8	K1.2
Feb 79	K1	1.8	K5	10	K5	0.2	K1.2
Mar 79	1.1	6.3	1.4	30	K5	.3	K1.2
Apr 79	K1	6.7	K5	30	K5	0.5	K1.2
May 79	K1	2.6	8	13.65	K5	.2	K1.2
June 79	K1	2.2	7	12	-	-	-
July 79	K1	2.8	11	14	K5	1.0	K1.2
Average	1.1	2.9	11.3	18	K5	.3	K1.2
High	2.3	6.7	57	30	K5	.8	K1.2
Low	K1	K1.1	K5	10	K5	K.1	K1.2

Station Location Bayfield, Wisconsin

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.72	0.96	0.30	0.10	-
Sept 78	-	-	-	-	-
Oct 78	0.16	-	0.40	-	-
Nov 78	-	0.40	0	0.04	0.1
Dec 78	.12	.17	.62	.08	.4
Jan 79	0.19	0.39	362	0.13	K.1
Feb 79	0.25	.42	0.92	0.06	K.1
Mar 79	0.15	0.30	0.11	0.03	0.1
Apr 79	1.63	2.48	0.89	0.19	0.1
May 79	1.01	1.39	0.47	.05	0.1
June 79	1.02	2.08	0.52	0.16	0.1
July 79	0.41	0.93	0.18	0.03	0.1
Average	.46	.73	.98	.09	.1
High	1.63	2.48	3.62	.19	.4
Low	.12	.17	.11	.03	K.1

Station Location Bayfield, Wisconsin

Parameter Concentrations
Units - ug/1
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	222	81	K6	K1	K2	K2	K5	K9	K.1
Sept 78	316	K80	7	K1	K2	K2	K5	10	K.1
Oct 78	-	-	-	-	-	-	-	-	-
Nov 78	342	K80	7	K1	K2	3	K5	K9	K.1
Dec 78	261	K80	K6	K1	K2	K2	K5	14	K.1
Jan 79	865	100	28	K1	K2	K2	K5	13	K.1
Feb 79	199	K80	K6	K1	K2	K2	9	K9	K.1
Mar 79	107	85	7	K1	K2	K2	K5	K9	K.1
Apr 79	151	K90	K6	K1	K2	K2	K5	K9	K.1
May 79	617	K80	7	K1	K2	K2	K5	10	-
June 79	-	-	-	-	-	-	-	-	=
July 79	379	K80	7	K1	K2	K2	K5	K9	-
Average	346	55	8	K1	K2	K2	K5	K9	K.1
High	865	100	28	K1	K2	3	9	14	K.1
Low	151	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Bayfield, Wisconsin

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	167	16	K6	K5	30	32	8	K2	69	K1
Sept 78	286	14	K6	K5	28	K8	17	K2	136	K1
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	K120	15	K6	10	25	K8	10	3	133	K1
Dec 78	444	7	K6	K5	31	K8	K6	K2	110	K1
Jan 79	978	36	K6	K5	32	22	26	K2	183	K1
Feb 79	206	11	K6	19	96	K8	K6	3	142	2
Mar 79	516	7	K6	K5	K15	K8	K6	K2	166	K1
Apr 79	189	13	K6	K5	K15	K8	K6	K2	180	K1
May 79	566	16	K6	K5	42	K8	18	K2	K50	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	496	21	K6	K5	K15	K8	11	K2	139	K1
Average	416	16	K6	7	40	12	11	2	387	K1
High	978	36	K6	19	96	32	26	3	183	2
Low	K120	7	K6	K5	25	K8	K6	K2	69	K1

Station Location Superior, Wisconsin - #1

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	5600	5600	5600	5600	50	6.5
Sept 78	1430	1430	1430	1450	123	7.5
Oct 78	500	500	500	500	270	7.9
Nov 78	500	500	500	500	205	7.7
Dec 78	500	500	500	500	2.5	7.6
Jan 79	500	500	500	500	125	7.1
Feb 79	2440	2450	2800	2563	24	7.1
Mar 79	3370	3480	-	3400	-	-
Apr 79	500	500	500	-	215	7.5
May 79	3650	5130	5030	-	64	6.4
June 79	4460	4320	4980	-	52	6.6
July 79	-	-	-	-	-	-
Average	2131	2264	2234	1887	140	7.4
High	5600	3480	2800	2563	270	7.9
Low	500	500	500	500	50	6.5

Station Location Superior, Wisconsin - #1

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	1	5	K5	K10	19.1	1.1	K1.2
Sept 78	K1	19.7	17	80	-	-	-
Oct 78	5.3	38.8	97	176	6.3	1.7	K1.2
Nov 78	6.8	21.8	127	132	39.8	2.0	1.8
Dec 78	11.8	28.3	109	.40	34	1.1	8.3
Jan 79	7.7	18.7	42	8	28.3	0.9	3.7
Feb 79	1.0	11.4	12	42	12.5	0.4	K1.2
Mar 79	-	-	-	-	-	-	-
Apr 79	K1	14.3	136	140	9.8	.3	K1.2
May 79	1.4	7.8	19	42	-	-	-
June 79	K1	5.6	22	34	-	-	-
July 79	-	-	-	-	-	-	-
Average	4.8	18.9	69	99	23	1.2	2.6
High	11.8	38.8	127	176	39.8	2.0	8.3
Low	K1	5	K5	K10	6.3	.4	K1.2

Station Location Superior, Wisconsin I

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.72	1.23	1.00	0.08	0.3
Sept 78	.94	1.50	1.05	.05	3.1
Oct 78	K0.03	5.58	4.76	0.42	8.3
Nov 78	1.43	2.44	1.41	0.11	0.1
Dec 78	1.35	1.66	1.77	.24	5.4
Jan 79	0.37	0.53	0.61	0.03	3.8
Feb 79	0.85	0.95	1.40	0.02	1.6
Mar 79	-	-	-	-	-
Apr 79	0.65	1.02	0.79	0.07	3.1
May 79	0.88	1.11	0.55	0.04	1.2
June 79	0.78	1.55	0.53	0.15	1.3
July 79	-	-	-	-	-
Average	.90	1.86	1.60	1.49	3.1
High	1.43	5.58	4.76	.42	8.3
Low	K0.03	.53	.61	.02	.1

Station Location Superior, Wisconsin - #1

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1890	K80	17	K1	K2	K2	7	20	K.1
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	226	K80	80	K1	K2	K2	K5	19	0.2
Nov 78	3100	K80	40	K1	K2	K2	12	28	0.1
Dec 78	2760	106	45	K1	13	K2	6	51	0.4
Jan 79	1150	80	18	K1	K2	K2	8	27	0.6
Feb 79	562	K80	8	K1	K2	K2	K5	K9	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	474	K80	6	K1	K2	K2	K5	K9	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1451	K80	31	K1	K2	K2	5	22	0.2
High	3100	106	80	K1	13	K2	12	51	0.6
Low	226	K80	6	K1	K2	K2	K5	K9	K.1

Station Location Superior, Wisconsin - I

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	2760	135	18	K5	75	20	99	7	91	K1
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	259	818	K6	K5	K15	K8	24	K5	179	K1
Nov 78	6030	297	7	K5	136	K8	146	12	332	K1
Dec 78	5770	140	13	K5	255	K8	136	18	277	3
Jan 79	3160	65	K6	21	116	K8	79	13	384	2
Feb 79	1050	19	K6	K5	27	K8	30	K2	415	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	878	26	K6	K5	K15	K8	28	K2	52	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	2843	214	7	K5	89	K8	77	7	254	1
High	6030	818	18	21	255	20	146	18	415	3
Low	259	19	K6	K5	K15	K8	24	K2	52	K1

Station Location Superior, Wisconsin - #2

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	500	500	500	500	-	6.7
Sept 78	1200	-	1230	1200	-	Leaked
Oct 78	600	-	600	600	260	7.9
Nov 78	1130	-	1080	1090	124	7.1
Dec 78	1130	-	1080	1080	165	7.5
Jan 79	500	500	500	500	160	7.9
Feb 79	1990	2320	2720	2343	64	5.1
Mar 79	2580	2030	2240	2283	-	-
Apr 79	500	500	500	500	218	7.8
May 79	4520	4490	4270	4270	62	6.3
June 79	3310	5190	4820	-	42	6.3
July 79	-	-	-	-	-	-
Average	1632	2604	1776	2000	135	6.9
High	2580	2320	2720	2343	260	7.9
Low	500	500	500	500	35	5.1

Station Location Superior, Wisconsin - #2

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	1	10	K.5	K10	11.4	1.0	11.2
Sept 78	-	-	-	-	-	-	-
Oct 78	5.3	42	68	169	-	-	-
Nov 78	1.8	17.3	74	82	29.0	1.4	K1.2
Dec 78	6.5	24.2	83	106	-	-	-
Jan 79	6.2	14.0	48	104	18.7	0.6	2.9
Feb 79	1.0	9.5	11	42	11.5	0.3	K1.2
Mar 79	-	-	-	-	-	-	-
Apr 79	1.1	16.5	232	142	-	-	-
May 79	1.6	7.9	9	40	7.7	.3	K1.2
June 79	K1	6.1	9	27	-	-	-
July 79	-	-	-	-	-	-	-
Average	3.6	17.1	46	88	17.7	.8	K1.2
High	6.5	42	83	169	29.0	1.4	2.9
Low	K1	2.4	K5	K10	11.4	.3	K1.2

Station Location Superior, Wisconsin II

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.07	1.56	1.34	0.07	4.6
Sept 78	.74	1.33	1.23	.05	Leaked
Oct 78	.68	1.92	2.12	.20	-
Nov 78	.074	1.55	1.56	0.11	1.7
Dec 78	1.93	2.22	0.39	0.12	4.1
Jan 79	0.56	0.82	0.76	0.06	3.8
Feb 79	0.87	1.16	1.17	K0.02	1.9
Mar 79	-	-	-	-	-
Apr 79	1.02	1.74	1.41	0.22	4.2
May 79	0.83	1.18	0.52	0.05	1.1
June 79	0.65	1.12	0.52	0.10	0.8
July 79	-	-	-	-	-
Average	.80	1.42	1.15	.09	3.0
High	1.93	2.22	2.12	.20	4.6
Low	.074	.81	.39	K0.02	1.6

Station Location Superior, Wisconsin - II

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	2290	K80	26	K1	K2	K2	8	16	K.1
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	-	-	-	-	-	-	-	-	0.1
Nov 78	1710	K80	21	K1	K2	K2	8	28	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	1030	K80	21	K1	K2	5	K5	K9	0.3
Feb 79	715	128	13	K1	K2	K2	K5	K9	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	476	K80	7	K1	K2	K2	K5	K9	K.1
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1244	K80	18	K1	K2	K2	5	11	0.1
High	2290	128	26	K1	K2	5	8	28	0.3
Low	476	K80	7	K1	K2	K2	K5	K9	K.1

Station Location Superior, Wisconsin - II

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	3850	129	9	K5	62	K8	111	8	96	K1
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	3540	184	7	K5	90	K8	81	10	202	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	3530	54	K6	K5	65	K8	76	5	191	K1
Feb 79	1020	20	K6	K5	36	K8	34	K2	142	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	951	25	K6	K5	K15	K8	29	K2	K50	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	2578	82	6	K5	52	K8	66	6	131	K1
High	3850	184	9	K5	90	K8	111	10	202	K1
Low	951	20	K6	K5	K15	K8	29	K2	K50	K1

Station Location Grand Marais, Minnesota

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	4200	3700	4300	4067	10	5.8
Sept 78	1260	1610	1210	1250	47	3.8
Oct 78	500	500	500	500	23	6.3
Nov 78	-	-	-	-	9-	5.1
Dec 78	-	-	-	-	39	4.5
Jan 79	-	-	-	-	18	4.7
Feb 79	2080	3560	2890	2843	23	4.3
Mar 79	2690	2860	3370	2973	-	-
Apr 79	-	-	-	-	31	4.6
May 79	4000	4540	4500	4250	29	4.6
June 79	1910	3410	3850	-	18	5.4
July 79	-	-	-	-	-	-
Average	2306	2833	2951	3440	55	4.9
High	4200	3700	4500	4067	47	6.3
Low	500	500	500	500	9	3.8

Station Location Grand Marias, Minnesota

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	K1	3	K5	10	-	-	-
Sept 78	1.6	3.7	22	32	-	-	-
Oct 78	2	3.6	18	16	K5	0.4	K1.2
Nov 78	K1	K3	8	K10	K5	K1	K1.2
Dec 78	5	5.5	20	24	K5	1.0	1.5
Jan 79	2.0	K1.0	9	12	K5	0.5	K1.2
Feb 79	K1	0.1	K5	16	K5	0.2	K1.2
Mar 79	-	-	-	-	-	-	-
Apr 79	K1	5.6	41	20	K5	K.1	K1.2
May 79	K1	4.7	16	19	-	-	-
June 79	K1	2.7	K5	12	-	-	-
July 79	-	-	-	-	-	-	-
Average	2	2.6	11	18	K5	.5	K1.2
High	5	5.5	22	32	K5	.5	1.5
Low	K1	K1	K5	K10	K5	K1	K1.2

Station Location Grand Marias, Minnesota

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.67	1.96	0.29	0.05	0.1
Sept 78	.88	.95	.56	K0.02	.2
Oct 78	0.69	0.95	0.55	0.04	0.2
Nov 78	0.19	0.27	0.37	K.02	K.1
Dec 78	0.81	0.98	0.05	0.08	0.6
Jan 79	0.21	1.13	0.45	K0.02	0.2
Feb 79	0.27	0.35	0.52	K0.02	3.8
Mar 79	-	-	-	-	-
Apr 79	0.13	0.26	0.12	K.02	0.4
May 79	0.66	1.63	0.80	0.05	0.1
June 79	0.84	1.64	0.53	0.11	0.1
July 79	0.83	2.03	0.47	0.10	-
Average	.48	.86	.36	.04	.85
High	.88	1.96	.80	.11	3.8
Low	.13	.26	.05	K.02	K.1

Station Location Grand Marais, Minnesota

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	554	K80	9	K1	K2	K2	K5	177	K.1
Nov 78	332	K80	K6	K1	K2	K2	K5	K9	K.1
Dec 78	2160	85	18	K1	K2	K2	K5	17	K.1
Jan 79	605	K80	K6	K1	3	K2	K5	K9	K.1
Feb 79	619	K80	8	K1	K2	K2	K5	K9	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	293	K80	K6	K1	K2	K5	K5	K9	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	760	K80	7	K1	K2	K2	K5	35	K.1
High	2160	85	18	K1	3	K2	K5	177	K.1
Low	293	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Grand Marais, Minnesota

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	838	24	K6	K5	K15	K8	52	K2	K50	K1
Nov 78	212	9	8	K5	K15	K8	8	K2	127	K1
Dec 78	2270	46	K6	K5	62	K8	42	K2	607	K1
Jan 79	998	18	K6	K5	19	K8	14	K2	12200	K1
Feb 79	526	12	K6	K5	K15	K8	12	K2	K50	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	310	7	K60	K50	38	K30	10	K2	K50	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	859	19	K6	K5	23	K8	23	K2	162	K1
High	2270	46	8	K5	62	K8	52	K2		K1
Low	212	7	K6	K5	K15	K8	8	K2	K50	K1

*Not Averaged

Station Location Silver Bay, Minnesota

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	pH
Aug 78	5150	5000	5270	5140	20	4.6
Sept 78	2200	2240	2370	2270	36	5.8
Oct 78	1200	1250	1300	1250	23	5.9
Nov 78	1500	1680	1400	1527	31	4.7
Dec 78	500	680	400	500	46	4.2
Jan 79	500	500	500	500	19	4.4
Feb 79	3350	3150	3080	3193	26	4.3
Mar 79	3940	3675	3920	3845	-	-
Apr 79	1520	1735	1515	1520	27	4.5
May 79	5350	5730	3950	-	26	4.5
June 79	-	-	-	-	20	4.9
July 79	-	-	-	-	-	-
Average	2890	2833	2890	2218	30	4.8
High	5350	5730	5270	5140	46	5.9
Low	500	500	500	500	19	4.2

Station Location Silver Bay, Minnesota

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	1	K1	K5	K10	-	-	-
Sept 78	1.8	5.9	20	22	-	-	-
Oct 78	2.4	3.0	42	16	K5	0.5	K1.2
Nov 78	3.4	4.3	44	20	K5	0.8	K1.2
Dec 78	1.3	3.8	136	30	K5	1.6	K1.2
Jan 79	2.0	2.9	90	12	K5	0.3	K1.2
Feb 79	K1.0	K1	24	18	K5	K0.1	K1.2
Mar 79	-	-	-	-	-	-	-
Apr 79	K1	5.4	36	18	-	-	-
May 79	K1	3.2	15	17	K5	K0.1	K1.2
June 79	K1	3.6	11	13	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.7	3.4	53	20	K5	.8	K1.2
High	3.4	5.9	136	30	K5	1.6	K1.2
Low	K1	K1	K5	K10	K5	K.1	K1.2

Station Location Silver Bay, Minnesota

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.57	1.19	0.57	0.08	0.2
Sept 78	.50	1.08	.65	.06	.1
Oct 78	0.24	1.14	0.45	0.04	0.1
Nov 78	0.65	0.94	0.65	0.03	0.1
Dec 78	0.68	0.84	K.03	0.1	8
Jan 79	0.14	0.29	0.46	0.03	0.3
Feb 79	0.31	0.54	0.54	K0.02	3.0
Mar 79	-	-	-	-	-
Apr 79	0.67	1.24	0.55	0.05	0.3
May 79	0.58	0.81	0.52	0.04	0.1
June 79	0.60	1.25	0.46	0.10	0.1
July 79	-	-	-	-	-
Average	.47	.91	.55	.06	.59
High	.68	1.25	.65	.1	8
Low	.14	.29	K.03	K0.02	.1

Station Location Silver Bay, Minnesota

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	K.1
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	281	K80	K6	K1	K2	K2	K5	K9	K.1
Nov 78	332	K80	K6	K1	K2	K2	7	12	K.1
Dec 78	2300	92	24	K1	K2	K2	15	446	0.1
Jan 79	918	K80	17	K1	K2	37	6	51	K.1
Feb 79	470	K80	9	K1	K2	K2	K5	K9	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	223	K80	K6	K1	K2	K2	9	7	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	754	K80	10	K1	K2	K2	7	88	K.1
High	2300	92	24	K1	K2	37	15	446	0.1
Low	223	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Silver Bay, Minnesota

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	268	10	K6	K5	18	K8	12	K2	459	K1
Dec 78	4000	165	16	K5	71	28	121	17	477	K1
Jan 79	36900	111	K6	K5	26	K8	75	15	197	K1
Feb 79	18100	54	K6	K5	16	K8	29	4	K50	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	5250	23	K6	K5	38	K80	14	K2	150	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	20103	73	K6	K5	33	K8	50	8	177	K1
High	40000	165	16	K5	71	28	121	17	477	K1
Low	268	10	K6	K5	16	K8	12	K2	K50	K1

Station Location Two Harbors, Minnesota

Parameter Concentrations
1978 & 79 Data

Month	Volume Collected (ml) Preservative Type				Specific Conductance	pH
	"No Add"	HNO_3	H_2SO_4	Average	umhos/cm	
Aug 78	500	-	500	500	-	-
Sept 78	2730	2520	2450	2567	39	4.1
Oct 78	1100	1075	1050	1075	19	5.5
Nov 78	1300	1300	1170	1257	28	5.8
Dec 78	500	500	500	500	38	4.8
Jan 79	500	500	500	500	19	4.6
Feb 79	4100	4500	4100	4233	-	-
Mar 79	3170	4280	3640	3697	-	-
Apr 79	1450	1250	1560	1420	27	4.5
May 79	6790	7100	3950	-	18	5.1
June 79	-	-	-	-	18	5.0
July 79	-	-	-	-	-	-
Average	2214	2558	1942	1792	25	5.0
High	6790	7100	4100	4233	39	5.8
Low	500	1075	500	500	8	4.1

Station Location Two Harbors, Minnesota

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	1.6	3.1	19	24	-	-	-
Oct 78	2.1	3.1	51	12	-	-	-
Nov 78	3.6	4.8	64	18	27.6	5.1	2.6
Dec 78	1.0	1.6	458	26	K5	0.6	K1.2
Jan 79	2.0	3.2	220	12	K5	0.4	K1.2
Feb 79	-	-	-	-	K5	K.1	K1.2
Mar 79	-	-	-	-	-	-	-
Apr 79	K1	4.9	27	18	K5	K.1	K1.2
May 79	K1	2.6	19	12	-	-	-
June 79	K1	2.6	26	12	-	-	-
July 79	-	-	-	-	-	-	-
Average	2.1	2.8	138	16	K5	2.0	K1.2
High	3.6	4.8	458	26	27.6	5.1	2.6
Low	K1	1.6	16	5	K5	K.1	K1.2

Station Location Two Harbors, Minnesota

Parameter Concentrations
Units - mg/l
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	0.57	0.71	0.36	0.03	-
Sept 78	.72	.87	.51	K0.02	.1
Oct 78	.49	.67	.45	.03	.2
Nov 78	0.56	1.2	0.6	K.02	K.1
Dec 78	.81	.98	.05	.08	0.3
Jan 79	0.14	0.28	0.59	0.02	0.1
Feb 79	0.38	0.40	0.63	K0.02	-
Mar 79	-	-	-	-	-
Apr 79	0.24	0.51	0.21	0.02	0.3
May 79	0.66	1.63	0.80	0.05	0.1
June 79	0.84	1.64	0.53	0.11	0.1
July 79	-	-	-	-	-
Average	.49	.70	.43	.03	.1
High	.81	1.6	.80	.08	.3
Low	.14	.28	.05	K.02	K.1

Station Location Two Harbors, Minnesota

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	-	-	-	-	-	-	-	-	K.1
Nov 78	4110	127	79	K1	K2	K2	63	86	0.1
Dec 78	1400	123	K6	K1	K2	K2	6	81	K.1
Jan 79	447	K80	K6	K1	K2	72	K5	18	K.1
Feb 79	304	K80	K6	K1	K2	K2	K5	K9	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	175	K80	K6	K1	K2	K2	K5	7	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1287	K80	20	K1	K2	15	15	40	K.1
High	4110	127	79	K1	K2	72	63	86	0.1
Low	175	K80	K6	K1	K2	K2	K5	K9	K.1

Station Location Two Harbors, Minnesota

Parameter Concentrations
Units - ug/l
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	14100	1380	25	K5	393	32	196	30	872	K1
Dec 78	10200	296	20	K5	55	32	49	32	186	K2
Jan 79	65300	207	13	K5	128	K8	18	24	98	K1
Feb 79	2680	13	K6	K5	K15	K8	9	K2	K50	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	1260	14	K6	K5	46	62	K6	K2	56	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	7810	382	13	K5	126	27	55	18	247	.6
High	65300	1380	25	K5	393	32	196	32	872	K2
Low	1260	13	K6	K5	K15	K8		K2	K50	K1

APPENDIX II

125-A

Station Location Conneaut, Ohio

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	10.3	2.8	4.5
Sept 78	K1	5	30	229*	K4	2.9	K0.9
Oct 78	2	14	K4	92	K4	2.8	K0.9
Nov 78	K1	7	20	48	8.0	1.7	K0.9
Dec 78	3.6	9.5	K4	15	34.7	6.9	11.6
Jan 79	K1	3.0	23	576*	K4	0.3	K0.9
Feb 79	3.5	9.7	35	43	K4	2.2	K0.9
Mar 79	K1	2.8	-	56	K4	1.8	K.9
Apr 79	K1	15.3	K4	60	-	-	-
May 79	K1	28.8	22	118	14	2.2	K.9
June 79	2.6	31	10	122	-	-	-
July 79	-	-	-	-	K4	5	K.9
Average	15	12.6	16	69	7.9	2.4	2.0
High	3.6	31.0	35	122	34.7	6.9	11.6
Low	K1	2.8	K4	15	K4	0.3	K0.9

*Not averaged due to probable acid contamination.

Station Location Conneaut, Ohio

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.67	5.68	4.18	0.75	-
Sept 78	4.11	7.43	6.42	0.26	2.02
Oct 78	—	—	—	—	—
Nov 78	0.43	0.69	0.97	0.06	0.1
Dec 78	0.49	0.95	1.42	K.02	0.2
Jan 79	0.38	0.55	1.24	0.04	0.3
Feb 79	0.18	0.53	1.30	0.03	0.2
Mar 79	0.90	1.89	1.79	0.08	1.8
Apr 79	1.95	4.3	1.77	0.75	0.2
May 79	3.18	7.04	5.33	0.37	0.4
June 79	4.50	11.01	7.32	0.36	0.6
July 79	0.95	2.54	4.35	0.12	-
Average	1.79	3.87	3.25	0.26	0.35
High	4.50	11.01	7.32	0.75	2.02
Low	0.18	0.53	0.97	K.02	0.1

Station Location Conneaut, Ohio

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1256	K58	32	K1	K1	K1	17	41	K.1
Sept 78	K237	K58	34	K1	K1	K1	K4	K4	K.1
Oct 78	517	K58	24	K1	K1	K1	K4	20	K.1
Nov 78	614	K58	1524	K1	K2	K1	6	23	K.1
Dec 78	225	K58	22	K1	K1	6	K4	55	.1
Jan 79	2531	214	65	3	K1	19	59	51	K.1
Feb 79	1440	192	27	K1	K1	20	K4	27	K.1
Mar 79	559	K58	10	K1	2	K1	8	12	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	1035	K58	26	K1	K1	K1	K4	86	-
June 79	-	-	-	-	-	-	-	-	-
July 79	44	K58	7	K1	K1	K1	K4	28	
Average	864	64	177	K1	K1	5	7	34	K.1
High	2531	214	1524	3	2	20	59	86	.1
Low	K237	K58	7	K1	K1	K1	K4	K4	K.1

Station Location Conneaut, Ohio

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	3800	88	12	K4	101	29	54	K1	258	K1
Sept 78	K237	50	K4	K4	K12	K5	K9	K1	187	K1
Oct 78	736	79	K4	K4	53	K5	26	K1	320	K1
Nov 78	2688	61	K6	K4	59	K7	22	4	254	K1
Dec 78	320	K6	14	K4	K12	K5	K9	K1	698	K1
Jan 79	13119	35	20	K4	65	K5	183	10	194	K1
Feb 79	7920	61	K4	K4	63	K5	55	K1	298	K1
Mar 79	1411	24	K4	K4	K12	K5	19	K1	216	K1
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	2118	86	K4	K4	125	K5	26	K1	505	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	1189	20	K4	K4	38	K5	12	K1	112	K1
Average	3341	51	6	K4	53	K5	40	2	304	K1
High	13.119	88		K4		29	183	10	698	K1
Low	K237	K6	K4	K4	K12	K5	K7	K1	112	K1

Station Location Painesville, Ohio

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	22.0	4.3	K0.9
Sept 78	2.5	15	35	K9	K4	1.6	K0.9
Oct 78	2.4	19	34	126	K4	0.9	K0.9
Nov 78	7.4	12	20	60	12.9	0.9	5.1
Dec 78	10.3	14.4	33	88	K4	0.4	5.0
Jan 79	K1	K1	13	26	9.4	1.1	4.6
Feb 79	10.7	10.4	21	290	K4	0.8	4.7
Mar 79	3.9	16.1	64	60	K4	-	3.4
Apr 79	-	-	-	-	K4	-	K0.9
May 79	4.5	26.4	125	132	K4	-	K0.9
June 79	10.7	73.0	103	436	-	-	-
July 79					K4	2.5	K0.9
Average	5.9	20.8	50	136	5.5	1.5	2.4
High	10.7	73.0	125	436	22.0	4.3	5.1
Low	K1	K1	13	K9	K4	0.4	K.9

Station Location Painesville, Ohio

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	3.23	5.00	5.72	1.52	1.5
Oct 78	3.27	5.56	5.37	0.12	0.9
Nov 78	0.65	1.78	1.21	0.16	0.6
Dec 78	0.48	0.94	1.17	0.46	0.2
Jan 79	0.29	0.19	1.09	K.02	0.2
Feb 79	0.26	0.97	1.42	K.02	0.5
Mar 79	0.80	1.65	1.65	K.02	0.5
Apr 79	3.20	7.69	6.36	0.28	-
May 79	5.20	10.63	8.72	0.24	0.10
June 79	15.7	-	18.64	0.91	2.16
July 79	11.6	19.5	10.7	0.09	-
Average	3.72	5.39	5.64	0.34	0.74
High	15.7	19.5	18.64	1.52	2.16
Low	0.26	0.19	1.09	K.02	0.1

Station Location Painesville, Ohio

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	3732	237	67	K1	K1	K1	K4	67	K.1
Sept 78	1002	K58	60	K1	K1	K1	K4	26	K.1
Oct 78	805	K58	23	K1	K1	K1	K4	K4	K.1
Nov 78	839	95	15	K1	K1	K1	K4	16	K.1
Dec 78	1114	K58	11	K1	4	K1	7	18	0.46
Jan 79	862	342	15	K1	K1	K1	K4	24	K.1
Feb 79	1036	K58	K4	K1	K1	K1	K4	39	K.1
Mar 79	1997	K58	150	K1	K1	K1	K4	26	K.1
Apr 79	1484	K58	12	K1	K1	K1	K4	16	-
May 79	1293	K58	57	K1	K1	K1	K4	K4	
June 79	-	-	-	-	-	-	-	-	-
July 79	-	1201	46	K1	K1	K1	K4	32	-
Average	1425	189	42	K1	K1	K1	K4	24	K.1
High	3732	1201	150	K1	4	K1	7	67	.46
Low	805	K58	K4	K1	K1	K1	K4	K4	K1

Station Location Painesville, Ohio

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	7174	197	26	K4	223	64	168	14	344	K1
Sept 78	1218	60	K4	K4	84	K5	53	K1	229	K1
Oct 78	1615	55	K4	K4	71	K5	40	K1	208	K1
Nov 78	893	35	11	K4	74	K5	44	K1	138	K1
Dec 78	996	28	7	K4	62	K5	29	K1	284	K1
Jan 79	931	31	17	K4	59	K5	29	K1	300	K1
Feb 79	1618	39	K4	K4	61	K5	39	K1	188	K1
Mar 79	3947	79	K4	K4	K30	K5	84	K1	274	K1
Apr 79	1389	43	K4	K4	36	K5	29	K1	100	K1
May 79	1517	78	21	18	53	K5	43	K1	K4	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	2572	114	K4	K4	121	K5	43	K1	245	K1
Average	2170	69	9	K4	78	5	5	K1	210	K1
High	7174	197	26	K4	223	64	168	14	344	K1
Low	893	28	K4	K4	K30	K5	29	K1	K4	K1

Station Location Vermilion, Ohio

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	26.2	3.7	K0.9
Sept 78	K1	12.9	K4	K9	15.5	2.5	K0.9
Oct 78	2	14.3	10	77	-	-	-
Nov 78	K1	7.9	-	114	-	-	-
Dec 78	2.4	47	479	138	42.8	9.1	K0.9
Jan 79	2.9	8.0	K4	50	8.8	3.9	2.5
Feb 79	3.3	7.0	K4	25	K4	0.7	K0.9
Mar 79	1.9	17.3	28.5	68	14.6	3.3	K.9
Apr 79	K1	19.6	11.8	76	K4	2.2	K.9
May 79	2.0	15.6	39	89	23.6	3.5	K.9
June 79	2.0	17.2	65	116	-	-	-
July 79	-	-	-	-	6.9	1.0	K.9
Average	1.8	16.7	71	76	15.8	3.3	K.9
High	3.3	47.0	479	138	42.8	9.1	2.5
Low	K1	7.0	K4	K9	K4	0.7	K.9

Station Location Vermilion, Ohio

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	4.69	8.68	6.51	0.21	0.4
Oct 78	1.87	3.60	3.11	0.21	0.6
Nov 78	0.37	3.37	1.05	0.26	5.5
Dec 78	-	-	-	-	2.9
Jan 79	0.16	0.22	0.59	K0.02	0.1
Feb 79	0.25	0.28	1.09	K0.02	0.1
Mar 79	0.88	1.96	1.68	0.15	0.3
Apr 79	2.74	5.38	4.31	0.18	0.8
May 79	4.37	9.89	6.25	0.36	0.9
June 79	4.75	11.44	5.82	0.34	0.5
July 79	2.2	7.2	3.3	0.09	-
Average	2.23	5.2	3.37	0.17	1.2
High	4.75	11.44	6.51	0.36	5.5
Low	0.16	0.22	0.59	K0.02	0.1

Station Location Vermillion, Ohio

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1051	K58	14	K1	K1	K1	K4	41	K.1
Sept 78	513	K58	10	K1	K1	K1	K4	11	K.1
Oct 78	-	-	-	-	-	-	-	-	-
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	6903	178	61	K1	6	K1	20	61	K.1
Jan 79	827	K58	K4	K1	K1	K1	33	K4	K.1
Feb 79	416	K58	7	K1	K1	K1	K4	K4	K.1
Mar 79	1097	K58	18	K1	K1	K1	K4	K4	-
Apr 79	1485	K58	38	K1	K1	K1	K4	25	-
May 79	1299	930	24	K1	K1	K1	K4	K4	-
June 79	-	-	-	-	-	-	-	-	-
July 79	226	K58	5	K1	K1	K1	K4	10	-
Average	1535	146	20	K1	K1	K1	7	17	K.1
High	6903	930	61	K1	6	K1	33	6	K.1
Low	226	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Vermillion, Ohio

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	2682	122	14	K4	144	39	39	6	254	-
Sept 78	821	75	K4	K4	80	K5	25	K1	106	K1
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	10,690	264	14	K4	529	20	179	18	398	K1
Jan 79	753	44	K4	K4	92	35	14	K1	604	
Feb 79	527	21	K4	K4	43	K5	12	K1	83	
Mar 79	2352	117	K4	K4	K12	K5	38	K1	K4	K1
Apr 79	2492	115	K4	K4	138	K5	55	K1	148	K1
May 79	1762	128	K4	K4	K12	K5	31	K1	K4	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	509	32	K4	K4	40	K5	7	K1	69	K1
Average	2509	102	K4	K4	120	12	44	3	185	K1
High	10,690	264	14	K4	529	39	179	18	604	K1
Low	509	21	K4	K4	K12	K5	7	K1	K4	K1

Station Location Crane Creek, Ohio

Parameter Loadings
Units - $mg/M^2/day$
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	16.4	4.1	4.1
Sept 78	1.0	16.8	K4	14	5.4	1.6	K.9
Oct 78	2.4	16.6	K4	59	6.2	2.4	K.9
Nov 78	K1	3.7	11	26	K4	0.3	K.9
Dec 78	1.6	1.9	20	16	K4	0.5	K.9
Jan 79	9.7	23.5	25.6	145	9.2	2.3	3.6
Feb 79	39.1	26.8	54.2	575	-	-	-
Mar 79	4.1	16.2	28.8	116	5.8	2.2	K.9
Apr 79	11.8	54.2	89.9	263	K4	.7	K.9
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	8.8	20.0	29.2	152	6.0	1.8	1.2
High	39.1	54.2	89.9	575	16.4	4.1	4.1
Low	K1	1.9	K4	14	K4	0.3	K.9

Station Location Crane Creek, Ohio

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	2.85	5.15	3.14	0.51	0.36
Oct 78	2.27	3.71	4.80	0.13	0.22
Nov 78	0.24	0.49	0.29	0.02	0.22
Dec 78	0.65	0.92	1.61	0.12	K.1
Jan 79	.40	3.07	7.28	0.08	0.49
Feb 79	5.82	11.37	31.56	0.28	1.64
Mar 79	2.72	7.72	0.06	0.59	0.36
Apr 79	2.21	3.35	2.94	0.08	1.58
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	2.27	4.47	6.46	0.23	0.62
High	5.82	11.37	31.56	0.59	1.64
Low	0.27	0.49	0.06	0.02	K.1

Station Location Crane Creek, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	526	48	K4	K4	46	36	13	K1	779	K1
Sept 78	588	38	K4	K4	37	K5	41	K1	130	K1
Oct 78	K237	37	K4	K4	K12	K5	9	K1	235	
Nov 78	686	15	K4	K4	20	K5	19	K1	312	
Dec 78	1063	23	30	K4	92	18	26	K1	378	K1
Jan 79	1248	58	35	K4	189	71	28	K1	7479	K1
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	1013	37	K4	12	38	K5	12	3	273	K.3
Apr 79	2278	78	K4	K4	K12	K5	40	K1	126	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	940	42	10	K4	54	17	24	K1	1214	K1
High	2278	78	35	12	189	71	41	3	7479	K1
Low	K237	15	K4	K4	K12	K5	9	K1	126	K1

Station Location Crane Creek, Ohio

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	447	409	K4	K1	K1	K1	10	38	K.1
Sept 78	467	K58	18	K1	K1	K1	K4	11	K.1
Oct 78	379	K58	7	K1	K1	K1	K4	K4	K.1
Nov 78	733	K58	6	K1	K1	K1	15	K4	K.1
Dec 78	924	K58	K4	K1	5	5	25	18	K.1
Jan 79	2318	245	20	K1	K1	K1	K4	30	0.1
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	812	69	12	K1	1.0	K1	14	9	-
Apr 79	1940	190	88	K1	K1	K1	K4	K4	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1002	143	13	10	1	1	9	14	K.1
High	2318	409	38	K1	5	5	25	38	.1
Low	379	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Paradise, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	3.4	K.9
Sept 78	3.6	18	K4	98	K4	K.07	K.9
Oct 78	K1	8	K4	148	K4	0.6	K.9
Nov 78	K1	14	7	69	K4	0.3	K.9
Dec 78	-	-	-	-	-	-	-
Jan 79	K1	1.6	K4	15	K4	K.07	K.9
Feb 79	-	-	-	-	-	-	-
Mar 79	K1	18.9	10.5	150	K4	K.1	K.9
Apr 79	K1	8.5	32	36	K4	.1	K.9
May 79	K1	4.8	32	23	K4	.4	K.9
June 79	K1	6.7	20	30	-	-	-
July 79					K4	K.1	K.9
Average	K1	10.1	14.6	71	K4	0.6	K.9
High	3.6	18.9	32	150	K4	3.4	K.9
Low	K1	1.6	K4	15	K4	K.1	K.9

Station Location Paradise, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	1.77	2.06	2.17	0.11	0.7
Oct 78	0.57	0.75	1.67	0.05	K.1
Nov 78	0.32	1.09	0.78	0.09	0.2
Dec 78	-	-	-	-	-
Jan 79	0.06	K.05	3.06	K.02	0.1
Feb 79	-	-	-	-	-
Mar 79	1.83	2.41	5.90	K.02	K.1
Apr 79	0.99	2.72	0.69	0.18	0.2
May 79	1.40	2.45	1.61	0.82	0.2
June 79	1.12	1.74	2.25	0.79	0.2
July 79	2.18	5.33	1.23	0.26	-
Average	1.14	2.06	2.24	0.26	0.3
High	2.18	5.33	5.90	0.82	0.7
Low	0.06	K.05	0.69	K0.02	K.1

Station Location Paradise, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	477	K58	18	K1	K1	K1	22	K4	K.1
Sept 78	604	K58	33	K1	K1	K1	K4	36	K.1
Oct 78	393	K58	K4	K1	K1	K1	K4	K4	K.1
Nov 78	240	K58	K4	K1	K1	K1	K4	K4	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	296	K58	14	K1	K1	K1	K4	K1	K.1
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	K237	K58	K4	K1	K1	K1	K4	K4	-
Apr 79	434	K58	K4	K1	K1	K1	K4	K4	-
May 79	575	498	14	K1	K1	K1	K4	K4	-
June 79	-	-	-	-	-	-	-	-	-
July 79	342	K58	K4	K1	K1	K1	K4	24	-
Average	387	76	10	K1	K1	K1	K4	5	K.1
High	604	498	33	K1	K1	K1	22	36	K.1
Low	K237	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Paradise, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	531	51	K4	K4	59	45	K9	K1	799	-
Sept 78	1902	123	K4	K4	119	K5	134	K1	419	K1
Oct 78	797	38	K4	K4	K12	K5	K9	K1	4881	K1
Nov 78	310	30	9	K4	37	K5	9	K1	100	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	237	9	11	K4	25	29	9	K1	150	K1
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	K237	K6	K4	K4	K12	K5	K7	K1	67	K1
Apr 79	368	6	K4	K4	K12	K5	12	K1	K4	K1
May 79	608	27	35	K4	K12	K5	22	K1	K4	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	510	K6	K4	K4	K12	K5	K7	K1	150	K1
Average	598	32	7	K4	33	10	22	K1	730	K1
High	1902	123	11	K4	119	45	134	K1	4881	K1
Low	K237	K6	K4	K4	K12	K5	K7	K1	K4	K1

Station Location Grand Marais, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	K.1	K.9
Sept 78	3.2	7.3	K4	20	K4	K.1	K.9
Oct 78	1.2	5.9	K4	24	7.5	2.0	K.9
Nov 78	K1	K1	7	K9	K4	K.1	K.9
Dec 78	13.1	14.5	53	63	K4	2.6	3.8
Jan 79	K1	2.1	3	21	K4	K.1	K.9
Feb 79	1.5	4.3	K4	36	K4	K.1	K.9
Mar 79	K1	9.5	15	65	K4	.2	K.9
Apr 79	K1	5.7	13	27	K4	K.1	K.9
May 79	K1	34.9	28	188	K4	K.1	K.9
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	K4	.1	K.9
Average	2.4	9.4	14	50	K4	15	K.9
High	13.1	349	53	188	7.5	2.6	3.8
Low	K1	K1	K4	K9	K4	K.1	K.9

Station Location Grand Marais, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.95	2.94	0.45	0.08	0.4
Oct 78	0.27	1.25	1.69	0.66	0.6
Nov 78	0.30	0.43	0.58	K.02	K.1
Dec 78	1.38	2.05	0.15	0.13	1.5
Jan 79	0.08	0.11	1.09	K.02	K.1
Feb 79	0.19	K.05	3.64	K.02	K.1
Mar 79	1.47	1.02	1.25	K0.02	0.1
Apr 79	0.70	0.76	0.51	K.02	K.1
May 79	1.09	1.74	2.19	0.07	K.1
June 79	2.19	3.2	1.92	0.07	-
July 79	0.74	2.01	0.96	0.09	-
Average	1.85	1.41	1.44	.10	.3
High	2.19	3.2	3.64	0.66	1.5
Low	0.08	K0.06	0.15	K0.02	K.1

Station Location Grand Marais, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	337	304	14	K1	16	K1	K4	41	K.1
Sept 78	274	K58	K4	K1	K1	K1	K4	K4	K.1
Oct 78	823	K58	9	K1	K1	K1	K4	24	K.1
Nov 78	633	K58	K4	K1	K1	K1	K4	K4	K.1
Dec 78	5538	218	46	K1	K1	K1	K4	44	K.1
Jan 79	346	K58	K4	K1	K1	K1	K4	K4	K.1
Feb 79	K23	K58	K4	K1	K1	K1	K4	12	K.1
Mar 79	438	K58	K4	K1	K1	K1	K1	K4	K4
Apr 79	362	K58	K4	K1	K1	K1	K1	K4	K4
May 79	666	K58	K4	K1	K1	K1	K4	K4	K4
June 79	-	-	-	-	-	-	-	-	-
July 79	K237	67	K4	K4	K1	K1	K4	16	-
Average	878	75	8	K1	2	K1	K1	K4	12
High	5538	304	46	K1	16	K1	K1	K4	44
Low	K237	K58	K4	K1	K1	K1	K1	K4	K4

Station Location Grand Marais, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	K237	18	K4	K4	65	K5	K7	K1	1229	K1
Sept 78	K237	71	K4	K4	K12	K5	523	K1	K4	K1
Oct 78	324	1022	10	K4	K12	K5	30	K1	149	K1
Nov 78	404	17	15	K4	K12	K5	15	K1	242	K1
Dec 78	5821	118	K4	K4	159	K5	108	K1	1556	K1
Jan 79	253	K6	K4	K4	30	33	K7	K1	215	K1
Feb 79	235	K6	K4	K4	K12	K5	K7	K6	56	K1
Mar 79	370	12	K4	K4	K12	K5	14	K1	136	K1
Apr 79	K237	13	K4	K4	K12	K5	K7	K1	K4	K1
May 79	533	22	K4	K4	K12	K5	19	K1	K4	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	K237	6	K4	K4	K12	K5	K5	5	K1	K1
Average	765	119	4	K4	28	K5	72	K1	335	K1
High	5821	1022	15	K4	159	33	523	K1	1556	K1
Low	K237	K6	K4	K4	K12	K5	K7	K1	K4	K1

Station Location Baraga, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	K.1	K.9
Sept 78	K1	2.0	K4	K9	K4	K.1	K.9
Oct 78	2	10	K4	43.4	K4	K.1	K.9
Nov 78	K1	2.6	67.5	K9	K4	K.1	K.9
Dec 78	2.2	3.3	K4	17.6	K4	K.1	K.9
Jan 79	K1	2.9	K4	24.5	9.6	1.1	4.7
Feb 79	1.7	2.0	12.1	24.2	K4	K.1	K.9
Mar 79	K1	8.7	24.9	55.2	K4	K.1	K.9
Apr 79	K1	7.9	15.8	39.4	K4	.4	K.9
May 79	K1	17.9	24.4	78.6	K4	K.1	K.9
June 79	K1	3.7	13.8	15.8	-	-	-
July 79	-	-	-	-	I4	K.1	K.9
Average	K1	6.1	17	31	4	.2	K.9
High	2.2	17.9	67.5	78.6	9.6	1.1	4.7
Low	K1	2.0	K4	K9	K4	K.1	K.9

Station Location Baraga, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.4	0.7	0.6	0.1	K.1
Oct 78	1	1.7	1.4	1.3	0.4
Nov 78	0.2	0.4	0.6	K.02	0.3
Dec 78	0.2	0.7	1	.06	K.1
Jan 79	K.06	0.1	0.9	K.02	K.1
Feb 79	0.1	0.5	1.5	K.02	0.2
Mar 79	0.4	1	1.5	K.02	K.1
Apr 79	1.4	1.8	1.1	.08	0.2
May 79	0.3	5.0	1.4	0.4	0.3
June 79	1.47	2.76	1.0	K.02	K.1
July 79	-	-	-	-	
Average	.6	1.5	1.1	0.2	0.2
High	1.47	5.0	1.5	1.3	0.4
Low	K.06	0.1	0.6	K.02	K.1

Station Location Baraga, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	640	K58	K4	K1	K1	K1	K4	K4	K.1
Sept 78	349	K58	K4	K1	K1	K1	K4	K4	K.1
Oct 78	1300	K58	13.8	K1	K1	K1	31.6	37.5	K.1
Nov 78	636	K58	K4	K1	K1	K1	K4	K4	K.1
Dec 78	255	K58	15.4	K1	8.8	K1	K4	K4	K.1
Jan 79	877	349	15	K1	K1	K1	K4	24.3	
Feb 79	K237	K58	K4	K1	K1	K1	K4	K4	K.1
Mar 79	K237	K58	K4	K1	K1	K1	K4	K1	-
Apr 79	1012	K58	12	K1	K1	K1	K4	K4	-
May 79	868	K58	17	K1	K1	K1	K4	26	
June 79	-	-	-	-	-	-	-	-	-
July 79	1021	K58	K4	K1	K1	K1	K4	K4	-
Average	654	K58	7.8	K1	K1	K1	K4	9	K.1
High	1300	349	17	K1	8.8	K1	31.6	37.5	K.1
Low	K237	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Baraga, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	565	37.3	42	K4	126	K5	K7	K1	266	K1
Sept 78	K237	18	18	K4	51.3	K5	36	K1	323	K1
Oct 78	1799	101	K4	K4	K12	K5	166	K1	1059	K1
Nov 78	563	K6	K4	K4	K12	K5	40.4	K1	178	K1
Dec 78	K237	K6	K4	K4	46.3	K5	19.8	K1	196	K1
Jan 79	948	31.9	16.9	K4	60	K5	30	K1	305	K1
Feb 79	K237	K6	K4	K4	K12	K5	K7	K1	297	K1
Mar 79	K237	K6	K4	K4	K12	K5	K7	K1	K4	K1
Apr 79	1220	18	K4	K4	K12	K5	32	K1	K4	K1
May 79	741	28	K4	K4	108	K5	20	K1	K4	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	948	28	K4	K4	K12	K5	26	K1	K4	K1
Average	660	25	18	K4	39	K5	35	K1	239	K1
High	1799	101	42	K4	126	K5	19.8	K1	166	K1
Low	K237	K6	K4	K4	K12	K5	K7	K1	K4	K1

Station Location Houghton, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	0.6	K.9
Sept 78	K1	4.9	K4	K9	K4	K.1	K.9
Oct 78	K1	2.5	14	62	K4	K.1	K.9
Nov 78	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	K1	3.2	8.3	19.7	K4	K.1	K.9
Feb 79	K1	7.3	K4	35	K4	3.5	K.9
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	K1	4.5	6.0	30	K4	0.8	K.9
High	K1	7.3	14	62	K4	3.5	K.9
Low	K1	2.5	K4	K9	K4	K.1	K.9

Station Location Houghton, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	0.80	1.33	1.51	0.04	0.2
Oct 78	0.39	0.69	0.47	0.04	0.1
Nov 78	-	-	-	-	-
Dec 78	-	-	-	-	-
Jan 79	0.10	0.45	0.67	1.02	K.1
Feb 79	0.37	0.55	1.33	K.02	0.7
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	0.42	0.76	0.10	0.28	0.3
High	0.80	1.33	1.51	1.02	0.7
Low	0.10	0.45	0.47	K.02	K.1

Station Location Houghton, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	921	K58	28	K1	K1	121	17	56	4.1
Sept 78	313	K58	12	K1	K1	K1	K1	K4	.5
Oct 78	242	K58	K4	K1	K1	K1	K1	K4	K.1
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	318	K58	K4	K1	K1	K1	K1	K4	K.1
Feb 79	398	K58	K4	K1	K1	K1	39	K4	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	438	K58	9	K1	K1	K1	12	7	15
High	921	K58	28	K1	K1	K1	39	56	4.1
Low	242	K58	K4	K1	K1	K1	K1	K4	K.1

Station Location Houghton, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	783	35	22	K4	205	66	35	K1	325	K1
Sept 78	244	21	K4	K4	29	K5	145	K4	191	K1
Oct 78	K237	22	K4	K4	K12	K5	15	K1	126	K1
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	247	K6	K4	K4	K12	43	K7	K1	170	K1
Feb 79	500	31	K4	39	K12	K5	K7	K1	531	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	378	22	4	6	50	23	40	K1	269	K1
High	783	35	22	39	205	66	145	K1	531	K1
Low	K237	K6	K4	K4	K12	K7	K1	K1	126	K1

Station Location Copper Harbor, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	K.1	K.9
Sept 78	-	-	-	-	-	-	-
Oct 78	-	-	-	-	K4.0	1.04	K.9
Nov 78	K1	K1	11.8	142	K4		K.9
Dec 78	K1	18	K4	246	K4	0.7	K.9
Jan 79	K1	5.2	K4	44	K4	0.5	K.9
Feb 79	K1	12	K4	155	K4	K.1	K.9
Mar 79	K1	6.1	K4	27.6	K4	K.1	K.9
Apr 79	K1	4.9	K4	27.9	K4	K.1	K.9
May 79	K1	8.9	15.6	31.1	K4	1.70	K.9
June 79	1.97	4.5	15.8	17.8	-	-	-
July 79	-	-	-	-	K4	.4	K.9
Average	K1	7.5	6.6	86.4	K4	.49	K.9
High	1.97	18	15.8	246	K4	1.04	K.9
Low	K1	K1	K4	17.8	K4.0	K.1	K0.9

Station Location Copper Harbor, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	-	-	-	-	-
Nov 78	0.3	0.6	0.7	K.02	K.1
Dec 78	0.3	2.2	2.2	0.2	0.7
Jan 79	0.1	0.5	0.9	0.1	K.1
Feb 79	1.5	2.5	6.2	K.02	0.7
Mar 79	K.06	K.05	0.3	K.02	K.1
Apr 79	0.5	0.7	0.6	K.02	K.1
May 79	1.2	2.3	1.1	0.1	0.2
June 79	1.3	2.6	0.8	0.2	K.1
July 79	1.05	2.53	1.01	0.3	-
Average	.70	1.9	1.5	.1	0.2
High	1.5	2.6	6.2	.3	0.7
Low	K.06	K.05	0.3	K.02	K.1

Station Location Copper Harbor, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	271	226	22.4	K1	6.1	K1	K4	28.5	1
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	258	K58	K4	K1	K1	K1	K4	K4	K.1
Nov 78	5476	K58	29.6	K1	K1	K1	K4	K4	K.1
Dec 78	1410	K68	94	K1	K1	K1	K4	K4	K.1
Jan 79	477	294	K4	K1	K1	K1	K4	K4	K.1
Feb 79	K180	643	K4	K1	K1	K1	K4	K4	K.1
Mar 79	237	K58	K4	K1	K1	K1	K4	K4	-
Apr 79	400	K58	K4	K1	K1	K1	K4	13	-
May 79	1450	458	11	K1	K1	K1	17	K4	-
June 79	-	-	-	-	-	-	-	-	-
July 79	651	K58	K4	K1	K1	K1	K4	14	-
Average	973	467	17	K1	K1	K1	K4	7	K.1
High	4576	643	92	K1	6.1	K1	17	28.5	1
Low	K180	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Copper Harbor, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	373	20.4	K4	K4	167	46.9	K7	K1	200	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	431	17.7	K4	K4	K12	K5	41.9	2.4	76.5	-
Nov 78	395	K6	K4	K4	59.2	K5	493	7.9	2405	-
Dec 78	890	K6	57.9	K4	133.9	K5	K7	K1	4189	-
Jan 79	K237	K6	K4	K4	71.1	55.8	K7	K1	574	
Feb 79	K237	K6	K4	K4	K12	K5	K7	K1	K4	-
Mar 79	K237	K6	K4	K4	K12	K5	K7	K1	45	K1
Apr 79	83	11	K4	K4	K12	K5	13	K1	170	K1
May 79	1026	33	17	K4	K12	K5	30	K1	251	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	661	20	K4	K4	K12	K5	18	K1	K4	K1
Average	452	12	9	K4	446	12	61	8	791	-
High	1026	33	57.9	K4	167	55.8	493	7.9	4187	-
Low	K237	K6	K4	K4	K12	K5	K7	K1	K4	-

Station Location Ontanagan, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	3.6	25.3	K4	72	K4	0.7	K.9
Sept 78	-	-	-	-	-	-	--
Oct 78	K1	5.3	30	-	K4	0.4	K.9
Nov 78	K1	25.6	43	-	K4	2.0	K.9
Dec 78	K1	2.2	K4	40	K4	K.5	K.9
Jan 79	3.9	6.9	K4	46	K4	K.2	K.9
Feb 79	2.6	6.5	K4	49	K4	K.2	K.9
Mar 79	K1	8.7	45	9	-	-	-
Apr 79	K1	5.9	23	62	-	-	-
May 79	K1	51.1	235	191	-	-	-
June 79	K1	11.0	69	47	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.6	17.9	47	65	K4	K.1	K.9
High	3.9	51.1	235	191	K4	2.0	K.9
Low	K1	2.2	174	9	K4	K.1	K.9

Station Location Ontanagan, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.06	3.62	1.16	0.22	1.1
Sept 78	1.12	1.97	0.63	0.12	-
Oct 78	0.88	3.88	0.46	0.17	0.8
Nov 78	0.47	1.10	0.61	0.06	0.4
Dec 78	0.35	1.12	0.82	0.07	0.2
Jan 79	0.09	K.05	1.29	K.02	K.1
Feb 79	0.22	0.77	2.17	K.02	0.2
Mar 79	0.13	0.12	0.54	K.02	0.1
Apr 79	0.82	2.18	0.49	0.17	0.3
May 79	3.04	5.61	3.91	0.50	4.1
June 79	2.25	4.52	1.60	0.34	0.4
July 79	10.28	13.0	0.20	1.63	-
Average	1.81	3.16	1.20	0.38	0.8
High	10.28	13	3.91	1.63	4.1
Low	0.09	K.15	0.46	K0.02	K.1

Station Location Ontanagon, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	658	K58	25	K1	K1	K1	K4	401	K.1
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	583	K58	9	K1	K1	K1	K4	186	K.1
Nov 78	4576	K58	30	K1	K1	K1	K4	540	K.1
Dec 78	485	K58	15	K1	K1	K1	K4	130	-
Jan 79	331	K58	K4	K1	K1	K1	20	85	K.1
Feb 79	249	K58	K4	K1	K1	K1	K4	217	K.1
Mar 79	K237	311	K4	K1	K1	K1	K4	118	-
Apr 79	1095	K58	10	K1	3	K1	K4	319	K.1
May 79	3569	1386	37	K1	K1	K1	41	580	-
June 79	-	-	-	-	-	-	-	-	-
July 79	249	108	K4	K1	K1	K1	K4	76	-
Average	1191	201	13	K1	K1	K1	8	265	K.1
High	249	1386	37	K1	3	K1	41	580	K.1
Low	K237	K58	K4	K1	K1	K1	K4	76	K.1

Station Location Ontanagon, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	1421	80	25	K4	K12	K5	27	K1	K4	K1
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	882	25	K4	K4	K12	K5	55	K1	K4	K1
Nov 78	6233	132	20	K4	59	K5	493	8	905	K1
Dec 78	697	17	K4	K4	41	K5	35	K1	310	K1
Jan 79	414	K6	32	57	118	K5	18	10	K4	6
Feb 79	250	K6	K4	K4	K12	K5	14	K1	K4	K1
Mar 79	537	13	K4	K4	K12	K5	20	K1	K4	K1
Apr 79	1116	27	K4	K4	K12	K5	38	K1	K4	K1
May 79	5158	138	K4	K4	K12	K5	267	K1	K4	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	414	12	K4	K4	K12	K5	22	K1	22	K1
Average	1711	45	9	5	26	K5	99	2	131	K1
High	6233	138	32	57	118	K5	493	10	905	6
Low	250	K6	K4	K4	K12	K5	14	K1	K4	K1

Station Location Beaver Island, Michigan

Parameter Loadings
Units - $mg/M^2/day$
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	3.2	K.9
Sept 78	K1	4.7	K4	18	K4	.5	K.9
Oct 78	2.8	8.5	K4	28	K4	.5	K.9
Nov 78	1.8	8.1	24	33	K4	.8	K.9
Dec 78	K1	2.1	10	22	K4	.3	K.9
Jan 79	2.2	4.9	K4	39	K4	4	K.9
Feb 79	K1	18.6	K4	342	K4	2.4	K.9
Mar 79	K1	7.7	16.4	25	K4	K.1	K.9
Apr 79	K1	6.3	K4	30	K4	K.1	K.9
May 79	K1	10.6	34.6	43	K4	.6	K.9
June 79	K1	5.1	K4	22	-	-	-
July 79	-	-	-	-	K4	1.6	K.9
Average	1.0	7.7	9.7	60	K4	1.3	K.9
High	2.8	18.6	34.6	342	K4	3.2	K.9
Low	K1	2.1	K4	18	K4	K.1	K.9

Station Location Beaver Island, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	1.85	1.91	1.26	K.02	0.3
Oct 78	0.86	0.89	1.40	0.05	0.3
Nov 78	0.51	0.74	0.68	0.09	0.2
Dec 78	0.58	0.99	1.55	K.02	0.2
Jan 79	0.71	1.36	0.28	0.04	K.1
Feb 79	0.22	0.65	1.32	0.04	K.1
Mar 79	1.48	1.78	1.78	0.06	0.3
Apr 79	1.03	1.72	1.13	0.08	K.1
May 79	2.25	2.52	1.72	0.12	0.2
June 79	0.93	1.32	255.6 *	0.14	K.1
July 79	0.80	1.60	0.97	0.14	-
Average	1.02	1.41	.90	.07	0.2
High	2.25	2.52	255.6	0.14	0.3
Low	0.22	0.65	0.28	K.02	K.1

* Not averaged probably nitric acid contamination

Station Location Beaver Island, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1795	492	41	K1	K1	K1	K4	101	K.1
Sept 78	500	K58	34	K1	K1	K1	16	K4	1.02
Oct 78	K237	K58	K4	K1	K1	K1	7	13	K.1
Nov 78	349	K58	K4	K1	K1	K1	K4	K4	K.1
Dec 78	653	K58	K4	K1	K1	K1	K4	K4	K.1
Jan 79	487	164	K4	K1	K1	K1	K4	K4	-
Feb 79	252	K58	K4	K1	K1	K1	K4	K4	-
Mar 79	530	K58	K4	K1	K1	K1	K4	K4	K.1
Apr 79	575	K58	K4	K1	K1	K1	K4	K4	-
May 79	530	K58	K4	K1	K1	K1	K4	K4	-
June 79	-	-	-	-	-	-	-	-	-
July 79	268	K58	K4	K1	K1	K1	K4	11	-
Average	513	83	8	K1	K1	K1	K4	13	K.1
High	1795	492	41	K1	K1	K1	16	101	1.02
Low	K237	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Beaver Island, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	1892	74	K4	K4	387	K5	64	K1	686	K1
Sept 78	376	334	K4	K4	71	K5	42	K1	K4	K1
Oct 78	K237	30	K4	K4	K12	K5	K7	K1	264	K1
Nov 78	274	11	K4	K4	19	K5	13	K1	483	K1
Dec 78	604	K6	11	K4	76	K5	19	K1	323	K1
Jan 79	260	K6	26	K4	87	87	K7	K1	320	K1
Feb 79	323	17	K4	K4	K12	K5	K7	K1	346	K1
Mar 79	560	K6	K4	K4	K12	K5	K7	K1	K4	K1
Apr 79	358	K6	K4	K4	K12	K5	125	K1	155	K1
May 79	K237	15	K4	K4	K12	K5	K7	K1	K4	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	308	16	K4	K4	K12	K5	K7	K1	K4	K1
Average	472	46	5	K4	62	8	26	K1	235	K1
High	1892	334	26	K4	387	87	64	K1	686	K1
Low	K237	K6	K4	K4	K12	K5	K7	K1	K4	K1

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Station Location St. Joseph, Michigan

Parameter Loadings
Units - $mg/M^2/day$
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	0.4	K.9
Sept 78	4	26	43	K9	K4	0.9	K.9
Oct 78	K1	4	6	17	K4	0.8	K.9
Nov 78	K1	16.2	10	82	24.6	6.5	4.3
Dec 78	K1	15	17	105	K4	1.1	K.9
Jan 79	3.3	24.5	7	206	K4	0.5	5.1
Feb 79	1.4	3.9	K4	26	K4	K.1	K0.9
Mar 79	-	-	-	-	K4	1.5	K.9
Apr 79	K1	52.8	K4	254	1.3	K.9	-
May 79	K1	10.7	28	57	K4	.9	K.9
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.5	19.1	14	94	30	1.4	1.3
High	4	52.8	43	254	24.6	6.5	5.1
Low	K1	3.9	K4	K9	K4	K.1	K.9

Station Location St. Joseph, Michigan

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.97	3.26	0.92	K.02	-
Sept 78	6.45	10.00	5.34	0.73	3.4
Oct 78	1.53	1.91	1.59	0.05	0.4
Nov 78	1.06	1.53	2.60	0.06	0.3
Dec 78	1.18	1.98	2.22	0.06	0.9
Jan. 79	0.44	0.59	1.69	0.21	0.3
Feb 79	0.54	0.73	1.59	K0.02	0.2
Mar 79	1.05	2.84	3.81	0.10	-
Apr 79	-	-	-	-	0.5
May 79	2.46	2.37	1.97	0.20	0.3
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	1.85	2.80	2.41	0.16	0.8
High	6.45	10.00	5.34	0.73	3.4
Low	0.44	0.59	0.92	K0.02	0.2

Station Location St. Joseph, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	281	254	K4	K1	K1	K1	K4	K4	K.1
Sept 78	641	K58	30	K1	K1	K1	K4	K4	.43
Oct 78	575	K58	14	K1	K1	K4	K4	K.1	
Nov 78	745	163	16	K1	K1	K1	13	92	K.1
Dec 78	1634	251	27	K1	K1	K1	K4	35	.57
Jan 79	764	454	18	K1	K1	K1	K4	K4	K.1
Feb 79	691	K58	K4	K1	K1	K1	K4	K4	.14
Mar 79	1223	K58	17	K1	K1	K1	K4	K4	-
Apr 79	1142	K58	18	K1	K1	K1	K4	K4	K.1
May 79	770	K58	11	K1	K1	K1	22	0	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	847	130	16	K1	K1	K1	5	15	.17
High	1634	454	30	K1	K1	K1	22	92	.57
Low	281	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location St. Joseph, Michigan

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	333	25	K4	K4	74	28	11	K1	84	K1
Sept 78	K237	64	K4	K4	145	K5	30	K1	265	K1
Oct 78	588	40	K4	K4	67	K5	26	K1	94	K1
Nov 78	901	92	K4	K4	117	K5	27	K1	289	K1
Dec 78	3477	108	K4	K4	175	K5	59	K1	496	K1
Jan 79	1031	51	21	K4	131	113	21	K1	344	K1
Feb 79	670	12	K4	K4	K12	K5	12	K1	83	K1
Mar 79	1884	63	K4	K4	88	K15	30	K1	K4	K1
Apr 79	1387	55	K4	K4	K12	K5	26	K1	224	
May 79	829	50	8	K4	76	K5	14	K1	116	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79										
Average	1122	56	4	K4	88	16	26	K1	200	K1
High	3477	108	21	K4	175	113	59	K1	496	K1
Low	K237	12	K4	K4	K12	K5	11	K1		K1

Station Location Chicago, Illinois - #1

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-
Oct 78	2.4	18	24	65	14.8	2.6	K0.9
Nov 78	2.6	38	33	83	18.3	3.4	1.7
Dec 78	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	2.5	28	29	74	16.6	14.3	1.1
High	2.6	38	33	83	18.3	3.4	1.7
Low	2.4	18	24	65	14.8	2.6	K0.9

Station Location Chicago, Illinois - #1

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	2.38	4.63	1.13	0.67	1.7
Nov 78	2.72	4.42	2.22	0.2	2.6
Dec 78	-	-	-	-	-
Jan 79	-	-	-	-	-
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	2.55	4.53	1.68	0.4	2.2
High	2.72	4.63	2.22	0.67	2.6
Low	2.38	4.42	1.13	0.2	1.7

Station Location Chicago, Illinois - #1

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	1136	K58	28	K1	K1	K1	32	40	K.1
Nov 78	2702	83	52	K1	K1	K1	40	57	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1919	56	40	K1	K1	K1	36	49	K.1
High	2702	83	52	K1	K1	K1	40	57	K.1
Low	1136	K58	28	K1	K1	K1	32	40	K.1

Station Location Chicago, Illinois - #1

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	3258	407	K4	K4	155	K5	62	12	339	K1
Nov 78	11243	907	16	K4	258	21	129	20	573	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	7251	657	9	K4	207	12	96	16	456	K1
High	11243	907	16	K4	258	21	129	20	573	K1
Low	3258	407	K4	K4	155	K5	62	12	339	K1

Station Location Chicago, Illinois - #2

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-
Oct 78	1.4	16.6	22	59	19.3	7.1	K.9
Nov 78	1.4	15.3	35	47	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.4	16	29	53	19.3	7.1	K.90
High	1.4	16.6	35	59	19.3	7.1	K.90
Low	1.4	15.3	22	47	19.3	7.1	K.90

Station Location Chicago, Illinois - #2

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	2.79	6.11	1.32	0.15	2.1
Nov 78	1.18	2.75	0.80	0.20	1.4
Dec 78	-	-	-	-	-
Jan 79	-	-	-	-	-
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	1.99	4.43	1.06	0.18	1.8
High	2.79	6.11	1.32	0.20	2.1
Low	1.18	2.75	0.80	0.15	1.4

Station Location Chicago, Illinois - #2

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	1564	K58	40	K1	K1	K1	55	45	K.1
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average									
High									
Low									

Station Location Chicago, Illinois - #2

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	5120	613	K4	32	221	K5	78	16	744	1.7
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average										
High										
Low										

Station Location Willmette, Illinois

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	K.1	K.9
Sept 78	K1	8	K4	K9	K4	1.0	2.7
Oct 78	4	20	43	101	27.2	9.1	K.1
Nov 78	6.4	31	44	162	17.2	5.5	2.5
Dec 78	K1	3.4	K4	58	K4	.5	K.9
Jan 79	36.7	10.1	3.04	116	K4	3.0	27.4
Feb 79	10.9	8.03	6	55	7.4	4.0	53.8
Mar 79	K1	3.4	41	16	K4	4.3	K.9
Apr 79	K1	1.3	55	492	K4	.5	K.9
May 79	1.1	6.7	17	36	3.3	1.3	K.9
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	6.9	10.2	24	116	6.7	2.9	9
High	36.7	31	55	492	27.2	9.1	53.8
Low	K1	1.3	K4	K9	K4	K.1	K.9

Station Location Wilmette, Illinois

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.62	2.54	1.38	0.14	-
Sept 78	1.08	1.46	1.20	K.02	.2
Oct 78	6.41	9.94	4.44	0.32	1.78
Nov 78	3.62	5.66	6.36	0.20	1.24
Dec 78	0.97	1.61	1.80	0.07	K.1
Jan 79	0.50	1.56	1.64	0.15	0.2
Feb 79	0.55	0.73	2.17	0.04	0.2
Mar 79	1.55	1.77	1.89	0.13	0.3
Apr 79	1.62	3.18	1.64	0.29	-
May 79	-	-	-	-	0.5
June 79	2.70	5.84	2.52	0.28	-
July 79	2.94	8.04	4.14	.31	-
Average	2.14	3.57	2.7	0.18	.6
High	6.41	9.94	6.36	0.32	1.78
Low	0.50	0.73	1.20	K.02	K.1

Station Location Willmette, Illinois

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	704	K58	18	K1	K1	K1	K4	22	K.1
Sept 78	521	K58	18	K1	K1	K1	K4	K4	K.1
Oct 78	1775	K58	43	K1	K1	K1	12	51	K.1
Nov 78	1610	174	39	K1	7	K1	14	53	K.1
Dec 78	302	K58	K4	K1	4	K1	K4	15	K.1
Jan 79	558	K58	20	K1	K1	K1	K4	77	K.1
Feb 79	669	K58	19	K.1	K1	K1	K4	29	.3
Mar 79	1178	K58	36	K1	K1	K1	K4	49	-
Apr 79	487	K58	6	K1	K1	K1	K4	4	K.1
May 79	760	K58	15	K1	3	K1	5	19	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	856	K58	22	K1	2	K1	4	32	K.1
High	1775	174	43	K1	7	K1	14	77	.3
Low	302	K58	K4	K1	K1	K1	K4	K4	K.

Station Location Wilmette, Illinois

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	1008	37	18	K4	120	20	24	K1	140	K1
Sept 78	635	45	K4	K4	71	K5	20	K1	110	K1
Oct 78	2387	146	K4	K4	385	K5	69	12	333	4
Nov 78	1828	117	K4	K4	438	K5	53	9	962	K1
Dec 78	464	18	15	K4	91	K5	11	K1	313	K1
Jan 79	787	60	K4	K4	197	87	18	K1	278	K1
Feb 79	1215	67	K4	K4	126	K5	13	K1	345	K1
Mar 79	2296	95	K4	K4	122	K5	82	K1	493	K1
Apr 79	845	24	K4	K4	15	K5	12	K1	56	K1
May 79	2220	41	4	K4	102	K5	20	3	549	
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	1368	65	5	K4	167	13	32	3	8	K1
High	2387	146	18	K4	438	87	83	12	962	4
Low	464	18	K4	K4	15	K5	11	K1	56	K1

Station Location Zion, Illinois

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	3.0	0.9
Sept 78	-	-	-	-	K4	4.0	K.9
Oct 78	4	20	69	97	11.6	3.7	K.9
Nov 78	-	-	-	-	37.7	18.5	K.9
Dec 78	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	4	20	69	97	13	7.3	K.9
High	4	20	69	97	37.7	18.5	K.9
Low	4	20	69	97	K4	3.0	K.9

Station Location Zion, Illinois

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.51	3.44	2.06	0.21	-
Sept 78	2.60	2.60	2.04	0.17	-
Oct 78	-	-	-	-	1.2
Nov 78	5.61	8.09	8.16	1.17	-
Dec 78	-	-	-	-	-
Jan 79	-	-	-	-	-
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	-	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	3.57	4.71	4.09	0.52	1.2
High	5.61	8.09	8.16	1.17	1.2
Low	2.51	2.60	2.04	0.17	1.2

Station Location Zion, Illinois

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1219	K58	27	K1	K1	K1	K4	48	K.1
Sept 78	671	K58	30	K1	K1	K1	K4	K4	3.9
Oct 78	1055	K58	K4	K1	6	K1	14	24	K.1
Nov 78	22372	562	167	K1	25	K1	93	136	5.4
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	6329	92	56	K1	8	K1	28	52	2.4
High	22372	562	167	K1	25	K1	93	136	5.4
Low	671	K58	K4	K1	K1	K1	K4	K1	K.1

Station Location Zion, Illinois

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	1521	76	27	K4	145	K5	36	K1	493	K1
Sept 78	952	59	K4	K4	46	K5	57	K1	205	K1
Oct 78	1596	69	K4	K4	178	K5	51	12	207	4
Nov 78	30839	445	49	49	1007	K5	834	62	1211	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	-	-	-	-	-	-	-	-	-	-
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	8727	162	20	8	344	K5	245	19	529	K1
High	30839	445	49	49	1007	K5	834	62	1211	4
Low	952	59	K4	K4	46	K5	36	K1	205	K1

Station Location Milwaukee, Wisconsin - #1

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	11.0	3.0	K.9
Sept 78	K1	18	K4	K9	K4	3.3	K.9
Oct 78	1	11	36	47	6.6	2.1	K.9
Nov 78	2.1	7.3	27	31	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	11.8	17.4	24	105	K4	4.5	7.6
Feb 79	-	-	-	-	24.7	10.3	55
Mar 79	K1	18.9	56	81	-	-	-
Apr 79	K1	16.5	22	60	K4	1.6	K.9
May 79	K1	6.9	60	37	4.7	1.4	K.9
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	2.4	13.7	32	52	7.6	3.7	2.2
High	11.8	18.9	60	105	24.7	10.3	7.6
Low	K1	6.9	K4	K9	K4	1.4	K.9

Station Location Milwaukee, Wisconsin - #1

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.80	3.0	2.48	0.19	-
Sept 78	3.10	4.52	3.42	0.08	0.4
Oct 78	1.05	1.56	1.11	0.39	0.6
Nov 78	0.62	1.13	0.99	0.08	0.3
Dec 78	-	-	-	-	-
Jan 79	2.61	2.95	3.39	K.02	0.4
Feb 79	-	-	-	-	-
Mar 79	-	-	-	-	0.5
Apr 79	1.95	2.56	1.95	0.14	0.3
May 79	1.40	2.50	1.32	0.23	0.3
June 79	4.69	7.48	5.94	0.10	-
July 79	-	-	-	-	-
Average	2.15	3.21	2.58	0.15	0.4
High	4.69	7.48	5.94	0.39	0.6
Low	0.62	1.13	0.99	K.02	0.3

Station Location Milwaukee, Wisconsin - #1

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1042	199	27	K1	K1	K1	14	66	K.1
Sept 78	679	K58	33	K1	K1	K1	K4	62	3.3
Oct 78	598	K58	8	K1	K1	K1	8	13	K.1
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	1869	K58	30	K1	K1	K1	K4	64	K.1
Feb 79	3826	K58	37	K1	K1	K1	79	43	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	996	K58	13	K1	K1	K1	K4	K4	K.1
May 79	786	K58	10	K1	K1	K1	8	11	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1399	K58	23	K1	K1	K1	16	37	0.6
High	3826	199	37	K1	K1	K1	79	66	3.3
Low	598	K58	8	K1	K1	K1	K4	K4	K.1

Station Location Milwaukee, Wisconsin - #1

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	1715	71	16	12	172	36	46	7	193	K1
Sept 78	969	66	33	K4	170	K5	58	K1	501	K1
Oct 78	904	39	K4	K4	101	K5	29	7	117	2
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	1621	70	27	K4	417	67	70	K1	578	K1
Feb 79	4477	126	22	81	371	K5	187	30	1578	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	1360	46	K4	K4	K12	K5	31	K1	158	K1
May 79	1049	35	K4	K4	48	K5	17	K1	1036	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	1728	65	15	15	184	16	62	6	594	K1
High	4477	126	33	81	417	67	187	30	1578	2
Low	904	35	K4	K4	K12	K5	17	K1	117	K1

Station Location Milwaukee, Wisconsin - #2

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	3.2	K.9
Sept 78	K1	11	K4	K9	K4	4.1	K.9
Oct 78	1	8	K4	32	-	-	-
Nov 78	2.7	7.6	26	43	8.6	3.7	1.3
Dec 78	-	-	-	-	-	-	-
Jan 79	13.3	11.5	24	107	K4	4.5	6.6
Feb 79	3.6	10.3	83	59	K4	0.8	K.9
Mar 79	K1	3.9	81	53	K4	4.0	K.9
Apr 79	K1	14.5	K4	49	K4	1.8	K.9
May 79	K1	7.1	30	35	4.1	1.4	K.9
June 79	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-
Average	2.8	9.2	31	48	K4	2.9	1.3
High	13.3	14.5	83	107	8.6	4.5	6.6
Low	K1	3.9	K4	K9	K4	0.8	K.9

Station Location Milwaukee, Wisconsin - #2

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.99	4.56	4.06	0.29	-
Sept 78	3.19	5.32	3.82	0.11	0.4
Oct 78	-	-	-	-	0.4
Nov 78	3.03	3.58	2.63	0.41	0.3
Dec 78	-	-	-	-	-
Jan 79	2.85	3.04	3.04	0.07	0.7
Feb 79	0.18	0.36	0.67	K.02	0.6
Mar 79	1.55	1.79	1.81	0.12	0.6
Apr 79	1.91	2.80	2.02	0.10	0.3
May 79	1.79	2.76	1.08	0.14	0.2
June 79	5.96	9.74	7.48	0.14	-
July 79	-	-	-	-	-
Average	2.61	3.77	3.96	.15	0.4
High	5.96	9.74	7.48	0.41	0.7
Low	0.18	0.36	0.67	K.02	0.2

Station Location Milwaukee, Wisconsin - #2

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	1893	79	47	16	245	39	51	8	318	K1
Sept 78	6783	127	K4	K4	191	K5	367	15	375	K1
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	2278	53	19	28	127	K5	127	10	490	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	2196	79	32	K4	368	58	79	K1	1389	K1
Feb 79	1647	41	14	18	116	K5	142	14	209	K1
Mar 79	3720	72	K4	K4	122	K5	114	K1	347	K1
Apr 79	1176	39	K4	K4	K12	K5	K7	K1	242	K1
May 79	1411	38	K4	K4	46	K5	22	K1	99	K1
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	2638	66	15	19	153	14	113	6	434	K1
High	6783	127	47	28	368	58	365	15	1389	K1
Low	1176	38	K4	K4	K12	K5	K7	K1	99	K1

Station Location Milwaukee, Wisconsin - #2

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	1071	160	28	K1	10	K1	22	37	K.1
Sept 78	3568	K58	64	K1	K1	K1	30	37	K.1
Oct 78	-	-	-	-	-	-	-	-	-
Nov 78	1351	K58	13	K1	K1	3	30	18	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	1231	K58	32	K1	K1	K1	K4	47	K.1
Feb 79	1213	K58	20	K1	K1	K1	14	K4	K.1
Mar 79	2270	442	53	K1	K1	K1	36	30	K.1
Apr 79	1172	302	50	K1	K1	K1	K4	K4	-
May 79	928	K58	10	K1	K1	K1	K4	10	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1600	131	34	K1	1	K1	17	23	K.1
High	3568	442	64	K1	10	3	30	36	K.1
Low	928	K58	10	K1	K1	K1	K4	K4	K.1

Station Location Two Rivers, Wisconsin

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-
Oct 78	-	-	-	-	K4	2.2	K.9
Nov 78	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-
Jan 79	1.9	10.5	7.69	68	K4	1.2	K.9
Feb 79	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-
June 79	1.2	10.1	10	44	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.6	10.3	8.8	56	K4	1.7	K.9
High	1.9	105	10	68	K4	2.2	K.9
Low	1.2	10.1	7.69	44	K4	1.2	K.9

Station Location Two Rivers, Wisconsin

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	-	-	-	-	-
Sept 78	-	-	-	-	-
Oct 78	-	-	-	-	-
Nov 78	-	-	-	-	-
Dec 78	-	-	-	-	-
Jan 79	1.46	2.34	3.24	K.02	0.2
Feb 79	1.64	2.27	3.08	-	-
Mar 79	-	-	-	-	-
Apr 79	-	-	-	-	-
May 79	-	-	-	0.1	-
June 79	-	-	-	-	-
July 79	-	-	-	-	-
Average	1.55	2.31	3.16	K.02	0.2
High	1.64	2.34	3.24	K.02	0.2
Low	1.46	2.27	3.08	K.02	0.1

Station Location Two Rivers, Wisconsin

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	963	K58	26	K1	K1	K1	K4	K4	K.1
Nov 78	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	1343	535	K4	K1	K1	K1	K4	K4	K.1
Feb 79	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1153	282	14	K1	K1	K1	K4	K4	K.1
High	1343	535	26	K1	K1	K1	K4	K4	K.1
Low	963	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Two Rivers, Wisconsin

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	972	57	K4	K4	34	K5	36	K1	122	-
Nov 78	-	-	-	-	-	-	-	-	-	-
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	844	27	K4	K4	136	K5	22	K1	2652	K1
Feb 79	-	-	-	-	-	-	-	-	-	-
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	-	-	-	-	-	-	-	-	-	-
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	908	42	K4	K4	85	K5	29	K1	1387	K1
High	972	57	K4	K4	136	K5	36	K1	2652	K1
Low	844	27	K4	K4	34	K5	22	K1	122	K1

Station Location Bayfield, Wisconsin

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	K4	K.1	K.9
Sept 78	-	-	-	-	K4	.8	K.9
Oct 78	-	-	-	-	-	-	-
Nov 78	4.5	K1	112	34	K4	K.1	K.9
Dec 78	K1	K1	K4	24	K4	K.1	K.9
Jan 79	2.6	K1	4.3	20	K4	1.6	K.9
Feb 79	K1	2.4	K4	13	K4	0.3	K.9
Mar 79	2.7	12.4	2.8	59	K4	K.1	K.9
Apr 79	K1	13.2	K4	59	K4	.2	K.9
May 79	K1	3.4	10.5	18	K4	.3	K.9
June 79	K1	4.3	14	24	-	-	-
July 79	-	-	-	-	K4	1.0	K.9
Average	1.5	4.6	19	31	K4	.4	K.9
High	4.5	13.2	112	59	K4	1.6	K.9
Low	K1	K1	K4	13	K4	K.1	K.9

Station Location Bayfield, Wisconsin

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.66	2.21	0.69	0.23	-
Sept 78	-	-	-	-	-
Oct 78	0.32	-	0.79	-	-
Nov 78	-	0.79	-	0.08	0.2
Dec 78	0.24	0.34	1.22	0.16	0.8
Jan 79	0.37	0.77	7.14	0.26	K.1
Feb 79	0.33	0.55	1.21	0.08	K.1
Mar 79	0.30	0.59	0.22	0.06	0.2
Apr 79	3.21	4.89	1.76	0.37	0.2
May 79	1.33	2.54	0.62	0.07	0.1
June 79	2.01	4.10	1.03	0.32	0.2
July 79	0.41	0.91	0.18	0.03	-
Average	1.02	1.80	1.49	0.17	.2
High	3.21	4.89	7.14	0.37	0.8
Low	0.27	0.34	0.18	0.03	K.1

Station Location Bayfield, Wisconsin

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	511	186	K4	K1	K1	K1	K4	K4	K.1
Sept 78	623	K58	14	K1	K1	K1	K4	20	K.1
Oct 78	-	-	-	-	-	-	-	-	-
Nov 78	675	K58	14	K1	K1	6	K4	K4	K.1
Dec 78	515	K58	K4	K1	K1	K1	K4	28	K.1
Jan 79	1706	197	55	K1	K1	K1	K4	26	K.1
Feb 79	262	K58	K4	K1	K1	K1	12	K4	K.1
Mar 79	K237	K58	K4	K1	K1	K1	K4	K4	-
Apr 79	K237	K58	K4	K1	K1	K1	K4	K4	-
May 79	812	K58	9	K1	K1	K1	K4	13	-
June 79	-	-	-	-	-	-	-	-	-
July 79	374	K58	7	K1	K1	K1	K4	K4	-
Average	572	62	11	K1	K1	K1	K4	10	K.1
High	1706	197	55	K1	K1	6	12	28	K.1
Low	K237	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Bayfield, Wisconsin

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	384	23	K4	K4	69	74	18	K1	159	K1
Sept 78	564	28	K4	K4	55	K5	36	K1	268	K1
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	K237	30	K4	20	49	K5	20	6	262	-
Dec 78	876	14	K4	K4	61	K5	K7	K1	217	K1
Jan 79	1929	71	K4	K4	63	43	51	K1	361	K1
Feb 79	271	14	K4	25	126	K5	K7	4	187	3
Mar 79	K237	K6	K4	K4	K12	K5	K7	K1	55	K1
Apr 79	K237	K6	K4	K4	K12	K5	K7	K1	59	K1
May 79	745	21	K4	K4	55	K5	24	K1	K4	3
June 79	-	-	-	-	-	-	-	-	-	-
July 79	489	21	K4	K4	K12	K5	11	K1	137	K1
Average	561	23	K4	6	50	14	17	1	171	K1
High	1929	71	K4	25	126	74	51	6	361	3
Low	K237	K6	K4	K4	49	K12	K9	K7	K4	K1

Station Location Superior, Wisconsin - #1

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	4	18	K4	K9	70.3	4.0	K.9
Sept 78	K1	18.1	15	73	-	-	-
Oct 78	10.4	76.5	191	347	12.4	3.4	K.9
Nov 78	13.4	42.9	250	260	78.5	3.9	3.6
Dec 78	23.3	55.8	215	276	67	2.2	16.4
Jan 79	15.2	36.9	83	158	55.8	1.8	7.3
Feb 79	1.6	17.9	19	66	20.5	0.7	K.9
Mar 79	-	-	-	-	-	-	-
Apr 79	1.8	28.2	268	276	K4	.1	K.9
May 79	2.8	15.4	37	83	-	-	-
June 79	1.2	11.0	43	67	-	-	-
July 79	-	-	-	-	-	-	-
Average	7.4	32.1	125	161	43.8	2.3	4.2
High	23.3	76.5	268	347	78.5	4.0	16.4
Low	K1	11.0	K4	K9	K4	.1	K.9

Station Location Superior, Wisconsin - #1

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.65	4.53	3.68	0.29	1.1
Sept 78	.87	1.38	0.97	0.05	2.9
Oct 78	K0.06	11.00	9.39	0.83	16.4
Nov 78	2.82	4.81	2.78	0.22	0.2
Dec 78	2.66	3.27	3.49	0.47	10.7
Jan 79	0.73	1.05	1.20	0.06	7.5
Feb 79	1.56	1.75	2.58	0.04	2.95
Mar 79	-	-	-	-	-
Apr 79	1.28	2.01	1.56	0.14	6.1
May 79	1.74	2.19	1.08	0.08	2.4
June 79	1.54	3.06	1.05	0.30	2.6
July 79	-	-	-	-	-
Average	1.59	3.50	2.78	0.25	5.3
High	2.82	11.00	9.39	0.83	16.4
Low	K0.06	1.05	0.97	0.04	0.2

Station Location Superior, Wisconsin - #1

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	6959	K58	63	K1	K1	K1	26	74	K.1
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	446	K58	K58	K1	K1	K1	K4	37	-
Nov 78	6114	K58	79	K1	K1	K1	K4	55	-
Dec 78	5444	209	89	K1	26	K1	12	101	-
Jan 79	2268	160	36	K1	K1	K1	16	53	-
Feb 79	924	K58	13	K1	K1	K1	K4	K4	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	K237	K58	K4	K1	K1	K1	K4	K4	K.1
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	3182	73	63	K1	2	K1	9	46	K.1
High	6959	209	158	K1	26	K1	26	101	K.1
Low	K237	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Superior, Wisconsin - #1

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	10161	497	66	K4	276	74	364	26	335	K1
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	511	1613	K4	K4	K12	K5	47	K1	353	K1
Nov 78	11893	586	14	K4	268	K5	288	24	655	K1
Dec 78	11381	276	26	K4	503	K5	268	36	546	6
Jan 79	6233	128	K4	41	229	K5	156	26	757	4
Feb 79	1726	31	K4	K4	44	K5	49	K1	682	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	289	9	K4	K4	K12	K5	9	K1	17	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	6028	449	16	5	190	7	169	16	478	2
High	11892	1613	66	41	503	74	364	35	757	6
Low	289	9	K4	K4	K12	K5	9	K1	17	K1

Station Location Superior, Wisconsin - #2

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	2	20	10	K9	22.5	2	K.9
Sept 78	-	-	-	-	-	-	-
Oct 78	10.5	82.8	134	333	-	-	-
Nov 78	1.3	13	35	61	57	2.8	K.9
Dec 78	13	48	164	209	-	-	-
Jan 79	12	28	95	205	37	1.2	5.7
Feb 79	1.7	16	18	71	15	0.4	K.9
Mar 79	-	-	-	-	-	-	-
Apr 79	2.2	32.5	458	2.8	K4	.1	K.9
May 79	3.2	15.6	18	79	-	-	-
June 79	1	12	18	53	-	-	-
July 79	-	-	-	-	-	-	-
Average	5.2	29.8	106	113	27	1.3	.9
High	13	82.8	458	333	57	2.8	5.7
Low	1	12.0	10	K9	K4	.1	K.9

Station Location Superior, Wisconsin - #2

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.10	3.07	2.64	0.14	9.1
Sept 78	0.59	1.64	1.0	.04	-
Oct 78	1.64	3.8	4.18	0.39	-
Nov 78	.053	1.10	1.11	.08	1.2
Dec 78	3.8	4.37	0.77	0.24	8.1
Jan 79	1.10	1.62	1.49	.12	7.5
Feb 79	1.56	2.07	2.09	.03	3.4
Mar 79	-	-	-	-	-
Apr 79	2.01	3.43	2.78	.44	8.3
May 79	1.64	2.33	1.03	0.10	2.2
June 79	1.28	2.21	1.03	0.20	1.6
July 79	-	-	-	-	-
Average	1.63	2.56	1.81	0.18	5.2
High	3.8	4.37	4.18	0.44	9.1
Low	0.53	1.10	0.77	0.03	1.2

Station Location Superior, Wisconsin - #2

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	7594	254	18	K4	122	K5	219	16	189	K1
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	6982	363	14	K4	178	K5	160	20	398	K1
Dec 78	-	-	-	-	-	-	-	-	-	-
Jan 79	6963	167	K4	K4	128	K5	150	10	378	K1
Feb 79	1556	39	K4	K4	55	K5	55	K1	217	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	313	8	K4	K4	K12	K5	10	K1	K4	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	4674	166	8	K4	98	K5	119	9	237	K1
High	7594	363	18	K4	178	K5	219	20	398	K1
Low	313	8	K4	K4	K12	K5	10	K1	K4	K1

Station Location Superior, Wisconsin - #2

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	4517	K58	51	K1	K1	K1	16	32	K.1
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	-	-	-	-	-	-	-	-	0.1
Nov 78	3372	K58	41	K1	K1	K1	16	55	K.1
Dec 78	-	-	-	-	-	-	-	-	-
Jan 79	2032	K58	41	K1	K1	K1	K4	K4	0.6
Feb 79	1091	195	20	K1	K1	K1	K4	K4	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	K237	K58	K4	K1	K1	K1	K4	K4	
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	2224	62	39	K1	K1	K1	8	19	.2
High	4517	195	51	K1	K1	K1	16	55	.6
Low	K237	K58	20	K1	K1	K1	K4	K4	K.1

Station Location Grand Marais, Minnesota

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	K1	8	K4	28	-	-	-
Sept 78	1.4	3.2	19	27	-	-	-
Oct 78	4	7.1	36	32	K4	K.1	K.9
Nov 78	K1	K1	16	K9	K4	K.1	K.9
Dec 78	10	11	39	47	K4	2	3.0
Jan 79	4	K1	18	24	K4	1.0	K.9
Feb 79	K1	0.1	K4	32	K4	0.4	K.9
Mar 79	-	-	-	-	-	-	-
Apr 79	K1	11.0	81	39	K4	K.1	K.9
May 79	1.4	9.3	32	37	-	-	-
June 79	K1	5.3	K4	24	-	-	-
July 79	-	-	-	-	-	-	-
Average	2.3	5.6	25	30	K4	1.6	K.9
High	10	11.0	81	47	K4	2	3.0
Low	K1	K1	K4	K9	K4	K.1	K.9

Station Location Grand Marais, Minnesota

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.27	5.54	0.82	0.14	0.28
Sept 78	0.69	0.75	0.44	K0.02	0.16
Oct 78	1.36	1.87	1.08	0.08	0.4
Nov 78	0.37	0.53	0.73	K.02	K.1
Dec 78	1.60	1.93	0.10	0.16	0.12
Jan 79	0.41	2.23	0.89	K.02	0.4
Feb 79	0.51	0.67	0.99	K.02	7.2
Mar 79	-	-	-	-	-
Apr 79	0.26	0.51	0.24	K.02	0.8
May 79	1.30	3.21	1.58	0.10	0.2
June 79	1.66	3.23	1.05	0.22	0.2
July 79	-	-	-	-	-
Average	0.94	2.05	0.79	0.08	.98
High	1.66	5.54	1.58	0.22	7.2
Low	0.26	0.51	0.10	K0.02	K.1

Station Location Grand Marais, Minnesota

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-
Oct 78	1092	K58	17	K1	K1	K1	K4	349	K.1
Nov 78	655	K58	K4	K1	K1	K1	K4	K4	K.1
Dec 78	4360	168	36	K1	K1	K1	K4	34	K.1
Jan 79	1193	K58	K4	K1	6	K1	K4	K4	K.1
Feb 79	1465	K58	19	K1	K1	K1	K4	K4	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	K237	K58	K4	K1	K1	K1	K4	K4	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1464	K58	13	K1	K1	K1	K4	65	K.1
High	4260	168	36	K1	6	K1	K4	349	K.1
Low	1237	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Grand Marais, Minnesota

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	1653	47	K4	K4	K12	K5	103	K1	K4	K1
Nov 78	418	18	16	K4	K12	K5	16	K1	250	K1
Dec 78	4477	91	K4	K4	122	K5	83	K1	1197	K1
Jan 79	1968	36	K4	K4	37	K5	28	K1	24063	K1
Feb 79	1245	28	K4	K4	K12	K5	28	K1	K4	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	K237	K6	K4	K4	12	K5	K7	K1	K4	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	1646	37	K4	K4	32	K5	44	K1	5124	K1
High	4477	91	16	K4	122	K5	103	K1	24063	K1
Low	K237	K6	K4	K4	K12	K5	K7	K1	K4	K1

Station Location Silver Bay, Minnesota

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	3.4	K1	K4	K34	-	-	-
Sept 78	2.6	8.5	29	32	-	-	-
Oct 78	1.9	2.4	33	13	K4	.4	K.9
Nov 78	3.4	4.2	43	20	K4	.9	K.9
Dec 78	2.6	7.5	268	59	K4	3.2	K.9
Jan 79	3.9	5.7	178	24	K4	.6	K.9
Feb 79	K1	K1	54	40	K4	K.1	K.9
Mar 79	-	-	-	-	-	-	-
Apr 79	K1	10.7	71	36	K4	K.1	K.9
May 79	K1	6.3	30	34	-	-	-
June 79	K1	7.1	22	26	-	-	-
July 79	-	-	-	-	-	-	-
Average	2.0	5.3	173	29	K4	.9	K.9
High	3.9	10.7	268	59	K4	3.2	K.9
Low	K1	K1	K4	K9	K4	K.1	K.9

Station Location Silver Bay, Minnesota

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	2.0	4.15	1.99	.28	.3
Sept 78	.79	1.70	1.03	.10	.3
Oct 78	.21	.97	.39	.03	K.1
Nov 78	.60	.87	.60	1.52	.10
Dec 78	1.34	1.66	K.06	.20	16
Jan 79	.28	.57	.91	.06	.59
Feb 79	.63	1.10	1.10	K.02	6.7
Mar 79	-	-	-	-	-
Apr 79	1.32	2.45	1.09	.10	.60
May 79	1.14	1.60	1.03	.08	.20
June 79	1.18	2.47	.91	.20	.20
July 79	-	-	-	-	-
Average	.95	1.75	.91	.26	2.5
High	2.0	4.15	1.99	1.52	16
Low	.21	.57	K.06	K.02	K.1

Station Location Silver Bay, Minnesota

Parameter Loadings
Units - ug/M^2/day
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	K.1
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	240	K58	K4	K1	K1	K1	K4	K4	K.1
Nov 78	371	K58	K4	K1	K1	K1	8	13	K.1
Dec 78	4536	181	53	K1	K1	K1	26	880	K.1
Jan 79	1811	K58	34	K1	K1	73	12	101	K.1
Feb 79	989	K58	19	K1	K1	K1	K4	K4	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	249	K58	K4	K1	K1	K1	10	8	K.1
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1589	39	19	K1	K1	6	10	168	K.1
High	4536	181	53	K1	K1	73	26	880	K.1
Low	240	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Silver Bay, Minnesota

Parameter Loadings
Units - $ug/M^2/day$
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	-	-	-	-	-	-	-	-	-	K1
Nov 78	300	11	K4	K4	20	K5	13	K1	513	K1
Dec 78	78896	325	32	K4	140	52	239	34	941	K1
Jan 79	72781	219	K4	K4	51	K5	148	8	99	K1
Feb 79	38080	114	K4	K4	34	K5	61	8	K4	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	5871	26	K4	K4	42	K5	16	K1	K4	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	39186	139	5	K4	57	7	95	10	311	K1
High	78896	325	32	K4	140	52	239	34	941	K1
Low	300	11	K4	K4	20	K5	13	K1	K4	K1

Station Location Two Harbors, Minnesota

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Chloride	Sulfate	Susp. Solids	Dissolved Solids	Ca	Mg	Na
Aug 78	-	-	-	-	-	-	-
Sept 78	2.8	5.5	34	43	-	-	-
Oct 78	1.5	2.2	37	9	-	-	-
Nov 78	3.1	4.1	55	15	24	4.4	2.2
Dec 78	2.0	3.2	903	51	K4	1.2	K.9
Jan 79	4.0	6.3	434	24	K4	0.80	K.9
Feb 79	-	-	-	-	K4	K.1	K.9
Mar 79	-	-	-	-	-	-	-
Apr 79	K1	9.7	53	36	K4	K.1	K.9
May 79	K1	5.1	38	24	-	-	-
June 79	K1	5.1	51	24	-	-	-
July 79	-	-	-	-	-	-	-
Average	1.9	5.2	201	28	4	1.3	K.9
High	4.0	9.7	903	51	24	4.4	2.2
Low	K1	2.2	34	9	K4	K.1	K.9

Station Location Two Harbors, Minnesota

Parameter Loadings
Units - mg/M^2/day
1978 & 79 Data

Month	Ammonia	TKN	Nitrate-Nitrite	Total Phosphorus	Silica
Aug 78	1.12	1.40	.71	.06	-
Sept 78	1.18	1.43	.84	K.02	.2
Oct 78	.35	.49	.33	.02	.2
Nov 78	.44	.95	.47	K.02	K.1
Dec 78	1.60	1.93	.10	.20	.60
Jan 79	.28	5	1.16	.04	.20
Feb 79	2.37	1.08	1.70	K.02	-
Mar 79	-	-	-	-	-
Apr 79	.47	1.0	.41	.04	.60
May 79	1.30	3.22	1.58	.10	.20
June 79	1.66	3.24	1.05	.22	.20
July 79	-	-	-	-	-
Average	1.08	1.53	.84	.07	.28
High	2.37	3.24	1.70	.22	.6
Low	.28	.49	.10	K.02	K11

Station Location Two Harbors, Minnesota

Parameter Loadings
Units - $ug/M^2/day$
1978 - 79 Data

Month	Al	B	Ba	Be	Cd	Co	Cr	Cu	Hg
Aug 78	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	K.1
Oct 78	-	-	-	-	-	-	-	-	K.1
Nov 78	3513	109	68	K1	K1	K1	54	74	K.1
Dec 78	2761	243	K58	K1	K1	K1	12	160	K.1
Jan 79	882	K58	K58	K1	K1	142	K4	36	K.1
Feb 79	899	K58	K58	K1	K1	K6	K4	K4	K.1
Mar 79	-	-	-	-	-	-	-	-	-
Apr 79	K237	K58	K4	K1	K1	K1	K4	6	-
May 79	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-
Average	1635	88	8	K1	K1	15	14	56	K.1
High	3513	243	68	K1	K1	142	54	160	K.1
Low	K237	K58	K4	K1	K1	K1	K4	K4	K.1

Station Location Two Harbors, Minnesota

Parameter Loadings
Units - ug/M^2/day
1978 & 79 Data

Month	Fe	Mn	Mo	Ni	Pb	Sn	Ti	V	Zn	Ag
Aug 78	-	-	-	-	-	-	-	-	-	-
Sept 78	-	-	-	-	-	-	-	-	-	-
Oct 78	-	-	-	-	-	-	-	-	-	-
Nov 78	1462	1180	22	K4	336	27	168	26	754	K1
Dec 78	20118	584	40	K4	109	63	97	63	367	K1
Jan 79	33728	408	26	K4	253	K5	36	47	193	K1
Feb 79	7929	39	K4	K4	K12	K5	27	K1	K4	K1
Mar 79	-	-	-	-	-	-	-	-	-	-
Apr 79	1078	12	K4	K4	39	53	K7	K1	48	K1
May 79	-	-	-	-	-	-	-	-	-	-
June 79	-	-	-	-	-	-	-	-	-	-
July 79	-	-	-	-	-	-	-	-	-	-
Average	8012	445	18	K4	149	30	66	27	273	K1
High	33728	1180	40	K4	336	63	168	63	754	K1
Low	1078	12	K4	K4	K12	K5	K7	K1	K4	K1